```
=> fil reg
FILE 'REGISTRY' ENTERED AT 16:09:03 ON 12 DEC 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2006 American Chemical Society (ACS)


=> d his nofile


     (FILE 'HOME' ENTERED AT 10:22:56 ON 12 DEC 2006)

     FILE 'HCAPLUS' ENTERED AT 10:23:06 ON 12 DEC 2006
L1              1 SEA WO2000-JP1370/AP

     FILE 'REGISTRY' ENTERED AT 10:24:24 ON 12 DEC 2006
L2              3 SEA (7440-37-1/BI OR 9002-84-0/BI OR 9003-01-4/BI)
L3              1 SEA 9003-01-4/RN

     FILE 'HCAPLUS' ENTERED AT 10:59:58 ON 12 DEC 2006
L4          20602 SEA L3
L5                QUE POLYACRYLIC# OR POLYACRYLATE# OR POLYMETHACRYLIC# OR
                  POLYMETHACRYLATE# OR POLY(A)(ACRYLIC# OR ACRYLATE# OR
                  METHACRYLIC# OR METHACRYLATE#) OR (POLY OR POLYM? OR
                  COPOLYM? OR HOMOPOLYM? OR RESIN?)(2A)(ACRYLATE# OR
                  METHACRYLATE# OR ACRYLIC# OR METHACRYLIC#)
L6                QUE POLYM? OR COPOLYM? OR HOMOPOLYM? OR RESIN?
L7                QUE CONDUCT?(3A)L6
L8                QUE GRAFT?(3A)L6
L9                QUE ELECTROLY?
L10               QUE MEMBRANE?(3A)L9
L11               QUE PERMEA? OR PERFORAT? OR PORO? OR MICROPORO? OR
                  SIEVE? OR PERVIOUS? OR IMPERVIOUS? OR PENETRAT? OR
                  INFILTRAT? OR PERVA? OR SEMIPERMEA?
L12               QUE PROTON?
L13          6700 SEA (L4 OR L5) AND L9
L14          9908 SEA (L7 OR L8) AND L9
L15          1746 SEA (L13 OR L14) AND L11
L16           423 SEA L15 AND L10
L17           162 SEA L16 AND L12
L18         68919 SEA FUEL?(2A)(CELL OR CELLS)
L19           154 SEA L17 AND L18
L20           134 SEA L19 AND L7
L21            19 SEA L19 AND L8
L22             9 SEA L20 AND L21
L23         17524 SEA L18(2A)L9
L24          4868 SEA L10(3A)L6
L25           126 SEA (L20 OR L21 OR L22) AND L23
L26            98 SEA L25 AND L24
L27             7 SEA L26 AND (1840-1999)/PY,PRY

     FILE 'REGISTRY' ENTERED AT 14:07:14 ON 12 DEC 2006
L28             1 SEA "METHACRYLIC ACID, POLYMERS"/CN

     FILE 'HCAPLUS' ENTERED AT 14:11:12 ON 12 DEC 2006
L29          6558 SEA L28
L30            15 SEA L29 AND L10
L31             8 SEA L30 AND L11
L32             3 SEA L31 AND (1840-1999)/PY,PRY
L33             9 SEA L17 AND (1840-1999)/PY,PRY
```

```
L34          12 SEA L27 OR L32 OR L33
L35             QUE INORG# OR INORGANIC?
L36           2 SEA L34 AND L35
L37          12 SEA L34 OR L36
L38             QUE PROCESS? OR METHOD# OR MANUFACTUR? OR MFR# OR
                PRODUC? OR MAKE OR MAKES OR MADE OR MAKING OR PREPAR? OR
                PREPD# OR PROCEDURE#
L39        9993 SEA L38 AND L10
L40             QUE (BOUND? OR FILL? OR FULFILL? OR IMPREGNAT?)(3A)L11
                D IS
L41         117 SEA L39 AND L40
L42          39 SEA L41 AND (L16 OR L30)
L43           8 SEA L42 AND (1840-1999)/PY,PRY
L44         541 SEA L18 AND L9 AND ((L4 OR L5 OR L29) OR L8)
L45             QUE HEAT?(2A)L6
L46          41 SEA L44 AND (L45 OR L35)
L47          13 SEA L46 AND L11
L48           3 SEA L47 AND (1840-1999)/PY,PRY
L49             QUE SOL OR SOL#
L50        3129 SEA L18 AND L9 AND L49
L51             QUE ELECTROD##
L52        1647 SEA L50 AND L51
L53        1205 SEA L52 AND L38
L54         415 SEA L53 AND L11
L55          39 SEA L54 AND L40
L56          19 SEA L55 AND L6
L57          11 SEA L56 AND (1840-1999)/PY,PRY
L58          37 SEA (L16 OR L31) AND L35
L59             QUE CERAMIC? OR GLASS?
L60           7 SEA L58 AND L59



=> fil hcap
FILE 'HCAPLUS' ENTERED AT 16:09:19 ON 12 DEC 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)


Search request I & II

=> d l37 ibib abs hitstr hitind 1-12

L37  ANSWER 1 OF 12  HCAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:        2002:221001  HCAPLUS
DOCUMENT NUMBER:         136:250268
TITLE:                   Improved membrane electrode assemblies using
                         ionic composite membranes for fuel cells
INVENTOR(S):             Fenton, James M.; Kunz, H. Russell; Lin,
                         Jung-Chou
PATENT ASSIGNEE(S):      University of Connecticut, USA
SOURCE:                  PCT Int. Appl., 35 pp.
                         CODEN: PIXXD2
DOCUMENT TYPE:           Patent
LANGUAGE:                English
FAMILY ACC. NUM. COUNT:  3
PATENT INFORMATION:
```

```
PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
---------------     ----   --------   --------------------
--------
WO 2002023646        A2    20020321   WO 2001-US28243
                                                             200109
                                                             10
WO 2002023646        A3    20020829
    W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
        CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE,
        GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
        LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,
        NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,
        TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD,
        RU, TJ, TM
    RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,
        CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
        TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN,
        TD, TG
US 6638659           B1    20031028   US 2000-660028
                                                             200009
                                                             12
                                         <--
CA 2422282           AA    20020321   CA 2001-2422282
                                                             200109
                                                             10
AU 2001096241        A5    20020326   AU 2001-96241
                                                             200109
                                                             10
EP 1323205           A2    20030702   EP 2001-977095
                                                             200109
                                                             10
    R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
        PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
PRIORITY APPLN. INFO.:                US 2000-660028       A
                                                             200009
                                                             12

                                      US 1999-132038P      P
                                                             199904
                                                             30
                                         <--
                                      US 2000-562235       A2
                                                             200004
                                                             28

                                      WO 2001-US28243      W
                                                             200109
                                                             10
```

AB A membrane electrode assembly is disclosed comprising a composite membrane having a first major surface area and a second major surface area comprising a **porous polymeric** matrix containing ionically **conductive** solid and ionomeric binder, at least one protective layer disposed adjacent to the **porous** polymeric matrix membrane comprising an ionomeric binder and an ionically conductive solid, an anode comprising an oxidizing catalyst adjacent the first major surface area of the composite membrane and a cathode comprising a reducing catalyst adjacent the second major surface area of the composite membrane, and a method for manufacturing the same.

IC ICM H01M
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT Fuel cell anodes
Fuel cell cathodes
Fuel cell **electrolytes**
Fuel cells
(improved **membrane** electrode assemblies using ionic composite membranes for fuel cells)
IT Sulfonic acids, uses
RL: DEV (Device component use); USES (Uses)
(perfluoro, **proton**-conducting ionomer; improved membrane electrode assemblies using ionic composite membranes for fuel cells)
IT Perfluoro compounds
RL: DEV (Device component use); USES (Uses)
(sulfonic acids, **proton**-conducting ionomer; improved membrane electrode assemblies using ionic composite membranes for fuel cells)

L37 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:618360 HCAPLUS
DOCUMENT NUMBER: 135:182626
TITLE: Facilitaed transport separation membranes using solid state polymer electrolytes
INVENTOR(S): Kang, Young-Soo; Park, Hyun-Chae; Won, Jong-Ok; Hong, Seoung-Uk; Kwon, Tak-Min
PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea
SOURCE: U.S. Pat. Appl. Publ., 8 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2001015334	A1	20010823	US 2000-749953		20001229
			<--		
KR 2001065738	A	20010711	KR 1999-65673		19991230
PRIORITY APPLN. INFO.:			KR 1999-65673	A	19991230
			<--		

AB The present invention relates to a non-volatile facilitated transport separation membrane prepared by using a solid state polymer electrolyte, characterized in that it has good stability and improved **permeance** and selectivity of alkene-series unsatd. hydrocarbons. According to the present invention, the facilitated transport separation membrane for the separation of alkene-series hydrocarbons is prepared by forming a solid state polymer electrolyte layer consisting of a non-volatile polymer and a transition metal salt capable of selectively and reversibly forming a complex with alkenes to a **porous** membrane. The facilitated transport

separation membrane thus prepared is characterized in that its **permeance** and selectivity of the alkenes are high, and that the complex formed by a polymer ligand and a metal in the solid state polymer electrolyte maintains its activity as a carrier of alkene-series hydrocarbons is maintained for a long time, even under dry, long-term operation.

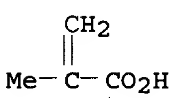
IT **25087-26-7**, Poly(methacrylic acid)
RL: TEM (Technical or engineered material use); USES (Uses)
(facilitated transport separation membranes using solid state polymer electrolytes)

RN 25087-26-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-41-4
CMF C4 H6 O2



IC ICM B01D071-02

INCL 210490000

CC 48-1 (Unit Operations and Processes)
Section cross-reference(s): 38, 45

ST facilitated transport sepn **membrane** polymer **electrolyte**; alkene series unsatd hydrocarbon sepn membrane

IT Ceramics
Membranes, nonbiological
Permeability
Polymer **electrolytes**
Separation
(facilitated transport separation **membranes** using solid state polymer electrolytes)

IT 2923-28-6, silver triflate 9002-81-7, Poly(methylene oxide) 9002-84-0, Ptfe 9002-89-5, Polyvinyl alcohol 9003-05-8, Poly(acryl amide) 9003-20-7, Poly(vinyl acetate) 9003-39-8, Poly(vinyl pyrrolidone) 9011-14-7, Pmma 14104-20-2, Silver tetrafluoroborate 16571-41-8, Trimethyl silyl 24938-67-8, Poly(oxy-2,6-dimethyl-1,4-phenylene) 24969-06-0, Poly(epichlorohydrin) 25014-12-4, Poly(methacryl amide) 25014-41-9, Poly(acrylonitrile) **25087-26-7**, Poly(methacrylic acid) 25189-55-3, Poly(N-isopropyl acryl amide) 25212-74-2, Poly(thio-1,4-phenylene) 25805-17-8, Poly(2-ethyl-2-oxazoline) 26793-34-0, Poly(N,N-dimethyl acrylamide) 81665-88-5, Poly(N,N-dimethyl methacrylamide)
RL: TEM (Technical or engineered material use); USES (Uses)
(facilitated transport separation membranes using solid state polymer electrolytes)

L37 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:284286 HCAPLUS
DOCUMENT NUMBER: 134:283338
TITLE: **Fuel cell**
INVENTOR(S): Bruder, Michael; Heiber, Uwe; Krause, Karl-Heinz; Merkmann, Gerhard
PATENT ASSIGNEE(S): Intech Thueringen G.m.b.H., Germany

SOURCE: PCT Int. Appl., 17 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001028023	A2	20010419	WO 2000-DE3263	20000920 <--
WO 2001028023	A3	20011227		
W: AU, BR, CA, CN, CZ, HU, IN, JP, KR, MX, PL, RU, SK, UA, US, ZA				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
DE 10046388	A1	20010419	DE 2000-10046388	20000920 <--
EP 1228548	A2	20020807	EP 2000-967596	20000920 <--
EP 1228548	B1	20040324		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
AT 262734	E	20040415	AT 2000-967596	20000920 <--

PRIORITY APPLN. INFO.: DE 1999-19949068 A 19991012 <--
WO 2000-DE3263 W 20000920

AB The invention relates to a **fuel cell** comprising at least the following components: a **proton-conducting polymer membrane** acting as the **electrolyte**, catalyst layers that cover the polymer membrane on both sides, gas-**permeable** electrodes in the form of an anode and a cathode which rest on a surface of the catalyst layers, whereby the surface is directed towards the outside, electroconductive plates which contact the electrodes in an electroconductive manner and at closely adjacent distances and, together with the electrodes, define gas-conducting channels as well as gas supplies for the supply of H on the one hand and O on the other hand. The inventive **fuel cell** is characterized in that the polymer membrane is a vulcanized caoutchouc mixture on the basis of a halogenated caoutchouc, especially when bromobutyl caoutchouc is used. The invention also relates to advantageous variants of the polymer membrane, e.g. when the caoutchouc mixture contains a mol. **sieve**/acid adduct.

IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 39
ST **fuel cell** polymer membrane; rubber
membrane electrolyte fuel cell
IT Synthetic rubber, uses
RL: DEV (Device component use); USES (Uses)
(brominated, vulcanized; **polymer electrolyte**
membrane fuel cell)
IT Butyl rubber, uses
RL: DEV (Device component use); USES (Uses)
(brominated; **polymer electrolyte**
membrane fuel cell)
IT Butyl rubber, uses
RL: DEV (Device component use); USES (Uses)
(chlorinated; **polymer electrolyte**
membrane fuel cell)
IT Synthetic rubber, uses
RL: DEV (Device component use); USES (Uses)
(chlorine-containing, vulcanized; **polymer**
electrolyte membrane fuel
cell)
IT Synthetic rubber, uses
RL: DEV (Device component use); USES (Uses)
(fluorinated, vulcanized; **polymer electrolyte**
membrane fuel cell)
IT Synthetic rubber, uses
RL: DEV (Device component use); USES (Uses)
(halogenated, vulcanized; **polymer electrolyte**
membrane fuel cell)
IT **Fuel cell electrolytes**
Fuel cells
(**polymer electrolyte membrane**
fuel cell)
IT Neoprene rubber, uses
Zeolites (synthetic), uses
RL: DEV (Device component use); USES (Uses)
(**polymer electrolyte membrane**
fuel cell)
IT 9010-85-9
RL: DEV (Device component use); USES (Uses)
(butyl rubber, brominated; **polymer electrolyte**
membrane fuel cell)
IT 9010-85-9
RL: DEV (Device component use); USES (Uses)
(butyl rubber, chlorinated; **polymer electrolyte**
membrane fuel cell)
IT 7664-38-2, Phosphoric acid, uses
RL: MOA (Modifier or additive use); USES (Uses)
(cellulose acetated loaded with; **polymer**
electrolyte membrane fuel
cell)
IT 9010-98-4
RL: DEV (Device component use); USES (Uses)
(neoprene rubber, **polymer electrolyte**
membrane fuel cell)
IT 9004-35-7, Cellulose acetate
RL: MOA (Modifier or additive use); USES (Uses)
(phosphoric acid-loaded; **polymer electrolyte**
membrane fuel cell)
IT 1343-98-2, Silicic acid

RL: MOA (Modifier or additive use); USES (Uses)
(polymer electrolyte membrane fuel cell)

L37 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:229200 HCAPLUS
DOCUMENT NUMBER: 134:254656
TITLE: Polymer **electrolyte fuel cells** and their manufacture
INVENTOR(S): Sakai, Osamu; Gyoten, Hisaaki; Kusakabe, Hiroki; Yasumoto, Eiichi; Sugawara, Yasushi; Kanbara, Teruhisa; Yoshida, Akihiko; Uchida, Makoto; Morita, Junji
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan
SOURCE: PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001022514	A1	20010329	WO 2000-JP6451 <--	20000920
W: CN, JP, KR, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1231656	A1	20020814	EP 2000-961147 <--	20000920
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY				
CN 1691391	A	20051102	CN 2005-10075907 <--	20000920
EP 1601035	A1	20051130	EP 2005-7628 <--	20000920
R: DE, FR, GB				
US 7097932	B1	20060829	US 2002-88484 <--	20020320
JP 2005228755	A2	20050825	JP 2005-138935 <--	20050511
US 2005214599	A1	20050929	US 2005-137514 <--	20050526
PRIORITY APPLN. INFO.:			JP 1999-266803 A	199909

		21
<--		
JP 1999-275762	A	19990929
<--		
JP 1999-305990	A	19991027
<--		
CN 2000-813176	A3	20000920
EP 2000-961147	A3	20000920
JP 2001-525786	A3	20000920
WO 2000-JP6451	W	20000920
US 2002-88484	A1	20020320

AB The **fuel cells** have a H+ **conductive** solid **polymer electrolyte membrane**, a cathode and an anode holding the **electrolyte membrane** in between, a conductive anode side separator having fuel gas passage facing the anode, a conductive cathode side separator having oxidant gas passages facing the cathode; where the cathode and anode have a gas diffusion layer and an **electrolyte** contact catalyst layer, the catalyst layer contains catalyst particles and a H+ **conductive polymer electrolyte**, and the cathode and/or the anode has H+ conductivity and gas **permeability** changing in their thickness direction. The **fuel cells** are prepared by mixing catalyst particles, H+ **conductive polymer electrolyte**, and a dispersing medium to form a catalyst layer ink, and repeatedly applying the ink to the gas diffusion layer or the H+ **conducting polymer electrolyte membrane.**

IC ICM H01M008-02
ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST polymer **electrolyte fuel cell** electrode **permeability** cond profile

IT Perfluoro compounds
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(alkanesulfonic acids, Flemion; structure and manufacture of electrodes with **proton** conductivity and gas **permeability** grades in thickness direction for polymer **electrolyte fuel cells**)

IT Sulfonic acids, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(alkanesulfonic, perfluoro, Flemion; structure and manufacture of electrodes with **proton** conductivity and gas **permeability** grades in thickness direction for polymer **electrolyte fuel cells**)

IT **Fuel cell** electrodes
(structure and manufacture of electrodes with **proton** conductivity and gas **permeability** grades in thickness direction for polymer **electrolyte fuel cells**)

IT Carbon fibers, uses
Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(structure and manufacture of electrodes with **proton** conductivity and gas **permeability** grades in thickness direction for polymer **electrolyte fuel cells**)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(structure and manufacture of electrodes with **proton** conductivity and gas **permeability** grades in thickness direction for polymer **electrolyte fuel cells**)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:646292 HCAPLUS
DOCUMENT NUMBER: 133:225582
TITLE: **Electrolyte membranes** for **fuel cells**, their manufacture, **fuel cells**, and manufacture of the **fuel cells**
INVENTOR(S): Yamaguchi, Takeo; Nakao, Shinichi
PATENT ASSIGNEE(S): Center for Advanced Science and Technology Incubation, Ltd., Japan
SOURCE: PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000054351	A1	20000914	WO 2000-JP1370	20000307 <--

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
AU 2000028310	A5	20000928	AU 2000-28310	

200003
07
<--
EP 1202365 A1 20020502 EP 2000-906746
200003
07
<--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL
PRIORITY APPLN. INFO.: JP 1999-60817 A
199903
08
<--
WO 2000-JP1370 W
200003
07

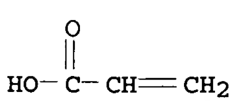
AB The **electrolyte membranes** have a **proton conductive polymer** filled in the pores fo a **porous** substrate not swellable by MeOH or H_2O. The substrate is an **inorg.** material or a heat resistant polymer. The membranes are prepared by irradiating the **porous** substrate with an energy beam and contacting the substrate with a monomer to form the polymer. The **fuel cells** have the **electrolyte membrane** formed on the catalyst layers of their cathodes or anodes, and are prepared by applying sol on an electrode, converting the sol layer to a **porous** substrate film, filling the pores in the film with the **proton conductive polymer**, and laminating with the other electrode.

IT **9003-01-4**, **Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)

RN 9003-01-4 HCAPLUS
CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7
CMF C3 H4 O2



IC ICM H01M008-02
ICS H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **fuel cell proton conductive polymer electrolyte**; polymer **electrolyte porous** substrate **fuel cell**
IT Plasma
(argon plasma in manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)

IT **Fuel cell electrolytes**
(manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)
IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)
IT 9002-84-0, Teflon **9003-01-4**, **Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)
IT 7440-37-1, Argon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of **polymer electrolyte membranes** containing heat resistant **porous** substrates for **fuel cells**)
REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:438107 HCAPLUS
DOCUMENT NUMBER: 133:46039
TITLE: Theoretical modeling of the electrophysical properties, structure, and functioning of low-temperature ion exchange membranes
AUTHOR(S): Eikerling, Michael H.
CORPORATE SOURCE: Germany
SOURCE: Berichte des Forschungszentrums Juelich (**1999**), Juel-3717, a, b, i-xvii, 1-176
CODEN: FJBEE5; ISSN: 0366-0885
DOCUMENT TYPE: Report
LANGUAGE: German

AB Electrophys. properties of **polymer-electrolyte membranes** (PEM), used as **proton conductors** and separators in **polymer electrolyte fuel cells** (PEFC), were studied and overpotential losses due to coupled transports of water and **protons** were calculated The models focus on the perfluorinated sulfonic acid ionomers, which hitherto are the material of choice in PEFC. The properties of these PEM are determined by their phase-separated morphol., consisting of water containing pathways for **proton** and water transport and hydrophobic parts which provide mech. stability and elasticity. In order to rationalize the water distribution in the **porous** polymer membrane and its effect on the **proton** conductivity, a random network model of **proton** transport was proposed, which takes into account the main features of the water distribution and of the specific swelling behavior. The specific bulk conductivity and capacity were calculated as functions of the water content within the effective medium approach. The obtained **proton** conductivity shows, in certain cases, a quasi-percolation behavior with a strong increase above a critical water content and a small residual conductivity below this value (the one for the residual conductivity along pore walls in the dry membrane). The calculated geometric capacity possesses a sharp maximum at the percolation threshold. A

comparison with exptl. conductivity data shows, that the low percolation thresholds, obtained in the model for Nafion-type membranes, can be explained by the existence of a well connected network of pores (of a few nm diameter) in which water is homogeneously distributed already at low water contents. A serious problem for low temperature **fuel cells** is the partial dehydration of the membrane under working conditions. A model, which takes into account the electroosmotic drag of water mols. from anode to cathode counteracted by a back-flow in a hydraulic pressure gradient, was considered. A balance between these fluxes is established in the stationary state, determining the gradient in water content across the membrane. Local values of **proton** conductivity, hydraulic **permeability** and electroosmotic coefficient are functions of the local water content. The latter is a function of the local capillary pressure in membrane pores. This function was measured, using a standard **porosimetry** method. The results allow conclusions about membrane properties and working conditions which favor better current-voltage characteristics and water management. According to these results, drying out of the membrane is a localized effect, being significant only close to the anode. At small **proton** currents the effect is negligible; but it can become dramatic close to a critical **proton** current, determined by the percolation threshold in **proton** conductivity The model provides insight into possible modes for the regulation of humidification conditions in the membrane under **fuel cell** working conditions by means of a large effective water flow from anode to cathode or by application of a gas pressure gradient between cathode and anode. Results of the hydraulic **permeation** model have been compared to solution-diffusion type models. A better correspondence of the former to exptl. data advocates the notion of membranes of Nafion-type as phase-separated, **porous** systems. A macro-homogeneous model for the cathode catalyst layer was studied, which includes the kinetics of the oxygen reduction at the catalyst|**electrolyte** interface, **proton** transport through the **electrolyte** network embedded into the layer, and oxygen diffusion through hydrophobized voids. Anal. solns. of the corresponding system of nonlinear equations are obtained in relevant ranges of parameters. Together with numerical results they help to trace the main system properties and operation modes, and the routes for the structure-function optimization. Namely, they rationalize the explicit effect of the kinetic parameters of oxygen reduction, the effect of the catalyst layer thickness, the width and the position of the used fraction of the layer, the dependence of performance on oxygen partial pressure, etc. The parameters controlling the performance of the layer are parameterized as functions of the composition The compositional changes can be controlled, for instance, by varying the portion of **electrolyte.** There is a composition for which the overvoltage losses are minimal. The higher the c.d., the larger is the **electrolyte** portion at which the min. is obtained.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 36, 38, 76

ST polymer membrane **fuel cell** electrophys property modeling; oxygen diffusion elec impedance fluoropolymer membrane **fuel cell**; Nafion polyoxyalkylene **membrane** **fuel cell** electrode **electrolyte** interface simulation

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(fluorine- and sulfo-containing, ionomers; theor. modeling of

electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(fluorine-containing, sulfo-containing, ionomers; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Pore
(micropore; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Diffusion
(oxygen; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Sulfonic acids, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(perfluorinated; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Ionomers
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Ionic conductivity
(**proton**; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Electric admittance
Electric conductivity
Electric impedance
Electric transport properties
Electrode-**electrolyte** interface
Electroosmosis
Fuel cell electrolytes
Fuel cell separators
Ion exchange membranes
Molecular topology
Overvoltage
Permeability
Polymer morphology
Porosity
Simulation and Modeling, physicochemical
Solid state **fuel cells**
Swelling, physical

Van der Waals force
(theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT Fluoropolymers, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT 7782-44-7, Oxygen, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(diffusion; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

IT 12408-02-5, Hydrogen ion, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(transport; theor. modeling of electrophys. properties, structure, and functioning of low-temperature ion exchange **membranes** for **polymer electrolyte fuel cells**)

REFERENCE COUNT: 152 THERE ARE 152 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:362780 HCAPLUS
DOCUMENT NUMBER: 133:7036
TITLE: **Proton-conductive** solid **polymer electrolyte membranes** for **fuel cells**
INVENTOR(S): Oomichi, Takahiro; Kawaguchi, Takeyuki
PATENT ASSIGNEE(S): Teijin Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000149965	A2	20000530	JP 1998-320425	19981111 <--

PRIORITY APPLN. INFO.: JP 1998-320425 19981111 <--

AB The **polymer electrolyte membranes** show piercing strength ≥300 g and mech. heat resistance ≥300°. The membranes may be composites of H+-**conductive polymer electrolytes** with **porous** thin films, which may be made of aramid fiber fabrics, sheets, or films with high strength and high gas

permeability.

IC ICM H01M008-02
ICS B32B005-18; C08J005-22

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST **polymer electrolyte membrane** strength **fuel cell**; aramid support polymer **electrolyte fuel cell**; heat resistance polymer **electrolyte fuel cell**

IT Polyamide fibers, uses
RL: DEV (Device component use); USES (Uses)
(aramid, fabrics, membrane supports; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Nonwoven fabrics
(aramid, membrane supports; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers, Nafion; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine-containing, sulfo-containing, ionomers, Nafion; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT **Fuel cell electrolytes**
Polymer **electrolytes**
(high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT **Conducting polymers**
(ionic; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Ionic **conductors**
(**polymeric**; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, Nafion; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, Nafion; high-strength heat-resistant H+-**conductive** solid **polymer electrolyte membranes** for **fuel cells**)

L37 ANSWER 8 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:631497 HCAPLUS

DOCUMENT NUMBER: 131:259912
TITLE: Membrane electrode assembly for **polymer electrolyte membrane fuel cell** and method for its manufacture
INVENTOR(S): Zuber, Ralf; Fehl, Knut; Starz, Karl-anton; Stenke, Udo
PATENT ASSIGNEE(S): Degussa-Huls A.-G., Germany; Umicore AG & Co. KG
SOURCE: Eur. Pat. Appl., 13 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 945910	A2	19990929	EP 1999-104630	19990309 <--
EP 945910	A3	20040107		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
DE 19812592	A1	19991007	DE 1998-19812592	19980323 <--
DE 19812592	B4	20040513		
EP 1536504	A1	20050601	EP 2005-3955	19990309 <--
R: DE, DK, FR, GB, IT, NL				
CA 2266239	AA	19990923	CA 1999-2266239	19990322 <--
US 6309772	B1	20011030	US 1999-274018	19990322 <--
JP 11329452	A2	19991130	JP 1999-77861	19990323 <--
BR 9900605	A	20000606	BR 1999-605	19990323 <--

PRIORITY APPLN. INFO.: DE 1998-19812592 A 19980323 <--
EP 1999-104630 A3 19990309 <--

AB The membrane electrode assembly of the **fuel cell**

comprises a **polymer electrolyte membrane** with **porous** reaction layers containing catalysts and ionomers on both sides of the membrane. The reaction layer has an inhomogeneous microstructure formed from an ionomer-impregnated and embedded catalyst portion and an ionomer-free catalyst portion in weight ratio (1-20):1, especially (3-10):1. The catalyst can be carbon-supported Pt-group metal or alloy particles. The reaction layer has pore volume 0.7-1.3, especially 0.8-1.2 mL/g, for pores with diameter 0.03-1 μm, and thickness 5-100, especially 10-100 μm. The ionomer can be a **proton-conducting** tetrafluoroethylene-fluorovinylether **copolymer** containing acid groups, e.g., Nafion.

IC ICM H01M008-10
ICS H01M004-92

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 67

ST membrane electrode assembly PEM **fuel cell**; **polymer electrolyte membrane fuel cell**

IT Carbon black, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst supports; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Platinum-group metals
RL: CAT (Catalyst use); USES (Uses)
(catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Glycols, uses
RL: NUU (Other use, unclassified); USES (Uses)
(ethers, solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(fluorine- and sulfo-containing, ionomers, **proton -conducting**; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(fluorine-containing, sulfo-containing, ionomers, **proton -conducting**; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ethers, uses
RL: NUU (Other use, unclassified); USES (Uses)
(glycol, solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Fuel cell electrolytes**
(**polymer membranes**; **membrane** electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Fuel cells**
(**polymer-electrolyte-membrane**; **membrane** electrode assembly for **polymer**

electrolyte membrane fuel
cells)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, **proton** -conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ionomers
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, **proton** -conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fluoropolymers, uses
Ionomers
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**proton**-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Alcohols, uses
Glycols, uses
Hydrocarbons, uses
Paraffin oils
RL: NUU (Other use, unclassified); USES (Uses)
(solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Solvents
(weakly polar; nonpolar; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses
RL: CAT (Catalyst use); USES (Uses)
(catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 77950-55-1, Nafion 115
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(membranes; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7439-89-6, Iron, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-18-8, Ruthenium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-62-2, Vanadium, uses
RL: CAT (Catalyst use); USES (Uses)
(platinum group metals alloyed with, catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 116-14-3D, Tetrafluoroethylene, fluorovinylether **copolymers** , functionalized 57578-63-9D, Perfluorovinylether-tetrafluoroethylene **copolymer**, functionalized
RL: DEV (Device component use); TEM (Technical or engineered

material use); USES (Uses)
(**proton-conducting**; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 56-81-5, 1,2,3-Propanetriol, uses 57-55-6, 1,2-Propanediol, uses 107-41-5, Hexylene glycol 110-38-3, Decanoic acid, ethyl ester 111-82-0, Dodecanoic acid, methyl ester 463-79-6D, Carbonic acid, alkyl esters, uses 25265-71-8, Dipropylene glycol
RL: NUU (Other use, unclassified); USES (Uses)
(solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

L37 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:515384 HCAPLUS
DOCUMENT NUMBER: 129:138467
TITLE: Phenomenological theory of electro-osmotic effect and water management in **polymer electrolyte proton-conducting membranes**
AUTHOR(S): Eikerling, M.; Kharkats, Yu. I.; Kornyshev, A. A.; Volfkovich, Yu. M.
CORPORATE SOURCE: Forschungszentrum Julich GmbH, Institut fur Werkstoffe und Verfahren der Energietechnik, Julich, D-52425, Germany
SOURCE: Journal of the Electrochemical Society (**1998**), 145(8), 2684-2699
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Partial dehydration of the **proton**-conducting membrane under working conditions is one of the major problems in low-temperature fuel cell technol. In this paper a model, which accounts for the electro-osmotically induced drag of water from anode to cathode and the counterflow in a hydraulic pressure gradient is proposed. A balance of these flows dets. a gradient of water content across the membrane, which causes a decline of the current-voltage performance. Phenomenol. transport equations coupled with the capillary pressure isotherm are used, involving the conductivity, **permeability**, and electro-osmotic drag coeffs. dependent on the local water content. The effects of membrane parameters on current-voltage performance are investigated. A universal feature of the obtained current-voltage plots is the existence of a critical current at which the potential drop across the membrane increases dramatically due to the dehydration of membrane layers close to the anode. For a membrane with zero residual conductivity in its dry parts, the critical current is a limiting current. Well below the critical current the effect of dehydration is negligible and the current-voltage plot obeys Ohm's law. The shape of the capillary pressure isotherm dets. the nonohmic corrections. A comparison of the results of this study to those of the pertinent diffusion-type models reveals qual. different features, the convection model is found to be closer to exptl. observations.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST fuel cell **proton** conducting membrane dehydration; electroosmotic effect water management fuel cell

IT Dehydration
Electroosmosis

Fuel cells
Simulation and Modeling, physicochemical
(phenomenol. theory of electro-osmotic effect and water management in **polymer electrolyte proton-conducting membranes**)

REFERENCE COUNT: 51 THERE ARE 51 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:443353 HCAPLUS
DOCUMENT NUMBER: 127:68582
TITLE: Processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for **fuel cells**
INVENTOR(S): Yen, Shaio-ping S.; Narayanan, Sekharipuram R.; Halpert, Gerald; Graham, Eva; Yavrouian, Andre
PATENT ASSIGNEE(S): California Institute of Technology, USA; Yen, Shaio-Ping S.; Narayanan, Sekharipuram R.; Halpert, Gerald; Graham, Eva; Yavrouian, Andre
SOURCE: PCT Int. Appl., 45 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9719480	A1	19970529	WO 1996-US18823 <--	19961122

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN
RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5795496	A	19980818	US 1995-561899 <--	19951122
CA 2238189	AA	19970529	CA 1996-2238189 <--	19961122
CA 2238189	C	20060829		
AU 9714068	A1	19970611	AU 1997-14068 <--	19961122
EP 870340	A1	19981014	EP 1996-944201 <--	19961122

EP 870340 B1 20040421
R: DE, FR, GB, IT, NL
JP 2000501223 T2 20000202 JP 1997-519946 19961122
<--
PRIORITY APPLN. INFO.: US 1995-561899 A 19951122
<--
WO 1996-US18823 W 19961122
<--

AB The processed polymer has asym. properties. The preferred **fuel-cell** assembly includes an anode which is a **porous** C electrode including C/catalyst particles coated with the processed sulfonic acid polymer. The anode current collector includes carbon paper fiber impregnated with the processed polymer. **Proton**-conducting membrane adjoins the cathode. The **proton**-conducting membrane includes a dense surface of **proton**-conducting membrane facing the anode. The surface facing the cathode is preferably a very thin layer of crosslinked low **proton**-conducting surface.

IC ICM H01M008-10
ICS H01M008-22; C08J005-18

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST sulfonic acid polymer **fuel cell** membrane; polymer sulfonic acid processed **fuel cell**

IT Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polyether-, aromatic, sulfonated; processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for **fuel cells**)

IT Polyethers, uses
Polyethers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polyketone-, aromatic, sulfonated; processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for **fuel cells**)

IT Polyethers, uses
Polyethers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polysulfone-, aromatic, sulfonated; processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for **fuel cells**)

IT **Fuel cell electrolytes**
(processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for)

IT 25667-42-9D, sulfonated 31694-16-3D, PEEK, sulfonated
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(processed sulfonic acid **polymer** for **proton-conducting electrolytic membranes** for **fuel cells**)

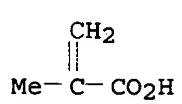
L37 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1989:241778 HCAPLUS
DOCUMENT NUMBER: 110:241778
TITLE: Electrochemical gas detection apparatus and method with novel three-component membrane
INVENTOR(S): Young, Ping; Polak, Anthony J.
PATENT ASSIGNEE(S): Allied-Signal, Inc., USA
SOURCE: U.S., 14 pp. Cont. of U.S. Ser. No. 753,494, abandoned.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 4795533	A	19890103	US 1987-71557		19870706 <--
PRIORITY APPLN. INFO.:			US 1985-753494	A1	19850710 <--

AB An electrochem. apparatus and method for detecting and measuring H and gaseous compds. capable of dissociating into or combining with H ions using a solid electrolyte concentration cell. A solid-**electrolyte membrane** comprising a 3-component blend prepared by admixing an organic polymer (poly(vinyl alc.)), an **inorg.** compound (a phosphoric acid), and a poly organic acid (poly(acrylic acid)), in a mutually miscible solvent. A reference substance in solid form is used. For increased strength, a membrane may be made composite with or attached to a **porous** support.
IT **25087-26-7**
RL: ANST (Analytical study)
(in 3-component membrane for electrochem. gas sensor)
RN 25087-26-7 HCAPLUS
CN 2-Propenoic acid, 2-methyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-41-4
CMF C4 H6 O2



IC ICM G01N027-58

INCL 204-1T
CC 79-2 (Inorganic Analytical Chemistry)
IT 2466-09-3, Diphosphoric acid 7664-38-2, Orthophosphoric acid, uses and miscellaneous 7803-60-3, Hypophosphoric acid 9002-89-5, Poly(vinyl alcohol) 9003-01-4, Poly(acrylic acid) 9004-35-7, Cellulose acetate 10343-62-1, Metaphosphoric acid 24981-14-4, Poly(vinylfluoride) **25087-26-7** 25322-68-3, Poly(ethyleneglycol) 26336-38-9 50851-57-5
RL: ANST (Analytical study)
(in 3-component membrane for electrochem. gas sensor)

L37 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1989:138716 HCAPLUS
DOCUMENT NUMBER: 110:138716
TITLE: Hydrogen separation and electricity generation using novel three-component membrane
INVENTOR(S): Young, Ping; Polak, Anthony J.
PATENT ASSIGNEE(S): Allied-Signal, Inc., USA
SOURCE: U.S., 13 pp. Cont. of U.S. Ser. No. 753,495, abandoned.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

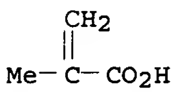
PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 4795536	A	19890103	US 1987-70622		19870706 <--
PRIORITY APPLN. INFO.:			US 1985-753495	A1	19850710 <--

AB An apparatus for performing an electrochem. process involving a gaseous mixture having a component which in presence of a catalytic agent is capable of dissociating to yield H+ or of combining with H+ comprises a thin-film polymer-blend membrane, a membrane housing comprising a 1st and a 2nd gas chamber separated by the membrane, 2 sep. portions of catalytic agent effective to promote the dissociation and combination, and means for forming elec. connection in operative contact with the catalytic agent. The apparatus comprises also means to supply fuel gas to 1 and oxidant gas to the other of the 2 chambers, or to supply the gaseous mixture to 1 and remove H from the other of the 2 chambers. The membrane possessing a high H+ conductivity and formed by removing the solvent from a solution of a blend of 3 components: H2PO3, HPO3, H3PO4, H4P2O7, and polyphosphoric acid .apprx.10-50; an organic polymer such as poly(vinyl alc.), poly(vinyl fluoride), etc. .apprx.40-80; and a poly(organic acid) such as poly(acrylic acid) .apprx.10-40 mol%. For increased strength, a membrane may be composited with or attached to a **porous** support. In 1 version, elec. conductive particles with catalyst are partly embedded in the membrane to form a H separating device.
IT **25087-26-7**, Poly(methacrylic acid)
RL: USES (Uses)
(**electrolyte membranes** from blends containing phosphoric acid-polymer-, for fuel cells and hydrogen separation)

RN 25087-26-7 HCAPLUS
CN 2-Propenoic acid, 2-methyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-41-4
CMF C4 H6 O2



IC ICM C25B001-02
ICS C25B009-00
INCL 204129000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 49, 72
IT Fuel cells
(**electrolyte membranes** for, phosphoric acid-polymer-poly(organic acid) blend)
IT Polyphosphoric acids
RL: USES (Uses)
(**electrolyte membranes** from blends containing polymer-poly(organic acid)-, for fuel cells and hydrogen separation)
IT 9002-89-5, Poly(vinyl alcohol) 9002-98-6, Polyethylenimine 9004-35-7, Cellulose acetate 24981-14-4, Poly(vinyl fluoride) 25322-68-3, Polyethylene glycol
RL: USES (Uses)
(**electrolyte membranes** from blends containing phosphoric acid-poly(organic acid)-, for fuel cells and hydrogen separation)
IT 9003-01-4, Poly(acrylic acid) **25087-26-7**, Poly(methacrylic acid) 50851-57-5, Poly(styrenesulfonic acid)
RL: USES (Uses)
(**electrolyte membranes** from blends containing phosphoric acid-polymer-, for fuel cells and hydrogen separation)
IT 2466-09-3, Pyrophosphoric acid 7664-38-2, Phosphoric acid, uses and miscellaneous 7664-93-9, Sulfuric acid, uses and miscellaneous 7803-60-3, Hypophosphoric acid 10343-62-1, Metaphosphoric acid
RL: USES (Uses)
(**electrolyte membranes** from blends containing polymer-poly(organic acid)-, for fuel cells and hydrogen separation)
IT 1333-74-0P, Hydrogen, preparation
RL: PREP (Preparation)
(separation of, **electrolyte membranes** from phosphoric acid-polymer-poly(organic acid) for)

Search request III

=> d l43 ibib abs hitstr hitind 1-8

L43 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:960825 HCAPLUS
DOCUMENT NUMBER: 138:211867
TITLE: Characterization of poly(3-methylthiophene) films with help of impedance measurements
AUTHOR(S): Schmitz, R. H. J.; Juttner, K.

CORPORATE SOURCE: Karl-Winnacker-Institut der DECHEMA e.V., Frankfurt am Main, Germany
SOURCE: GDCh-Monographie (**1999**), 18(Metalle in der Elektrochemie), 282-286
CODEN: GDCHAI
PUBLISHER: Gesellschaft Deutscher Chemiker
DOCUMENT TYPE: Journal
LANGUAGE: German

AB Impedance measurements on poly(3-methylthiophene) (PMT) were carried out in the asym. system Pt / PMT film / **electrolyte** and in the sym. system **electrolyte** / PMT **membrane** / **electrolyte.** The following parameters were varied: film thickness, **electrolyte** concentration, temperature and polarization potential, i.e. degree of oxidation of the polymer. In both systems, a distinct dependence of the impedance spectra on the concentration of the **electrolyte** was found, which can be explained in terms of a heterogeneous pore model rather than by a homogeneous transport model. Electrochem. **prepared** PMT films and membranes are **porous** and **filled** with **electrolyte** solution

CC 72-4 (Electrochemistry)
Section cross-reference(s): 36, 76

IT **Conducting polymers**
Electric impedance
Films
(poly(3-methylthiophene) films studied with impedance measurements)

IT 3109-63-5, Tetrabutylammonium hexafluorophosphate
RL: NUU (Other use, unclassified); USES (Uses)
(**electrolyte**; poly(3-methylthiophene) films studied with impedance measurements)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:646292 HCAPLUS
DOCUMENT NUMBER: 133:225582
TITLE: **Electrolyte membranes** for fuel cells, their **manufacture**, fuel cells, and **manufacture** of the fuel cells
INVENTOR(S): Yamaguchi, Takeo; Nakao, Shinichi
PATENT ASSIGNEE(S): Center for Advanced Science and Technology Incubation, Ltd., Japan
SOURCE: PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000054351	A1	20000914	WO 2000-JP1370	20000307 <--

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,

ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,
SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZW
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF,
BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

AU 2000028310 A5 20000928 AU 2000-28310 20000307 <--

EP 1202365 A1 20020502 EP 2000-906746 20000307 <--

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL

PRIORITY APPLN. INFO.: JP 1999-60817 A 19990308 <--
WO 2000-JP1370 W 20000307

AB The **electrolyte membranes** have a proton **conductive polymer** filled in the pores fo a **porous** substrate not swellable by MeOH or H2O. The substrate is an inorg. material or a heat resistant polymer. The membranes are **prepared** by irradiating the **porous** substrate with an energy beam and contacting the substrate with a monomer to form the polymer. The fuel cells have the **electrolyte membrane** formed on the catalyst layers of their cathodes or anodes, and are **prepared** by applying sol on an electrode, converting the sol layer to a **porous** substrate film, **filling** the pores in the film with the proton **conductive polymer**, and laminating with the other electrode.

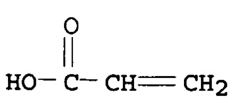
IT **9003-01-4**, **Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

RN 9003-01-4 HCAPLUS

CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7
CMF C3 H4 O2



IC ICM H01M008-02
ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell proton **conductive polymer electrolyte**; polymer **electrolyte porous** substrate fuel cell

IT Plasma
(argon plasma in manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

IT Fuel cell **electrolytes**
(manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

IT 9002-84-0, Teflon **9003-01-4**, **Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

IT 7440-37-1, Argon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of polymer **electrolyte membranes** containing heat resistant **porous** substrates for fuel cells)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:271598 HCAPLUS
DOCUMENT NUMBER: 130:284488
TITLE: Membrane electrode assemblies
INVENTOR(S): Debe, Mark K.; Larson, James M.; Balsimo, William V.; Steinbach, Andrew J.; Ziegler, Raymond J.
PATENT ASSIGNEE(S): Minnesota Mining and Manufacturing Company, USA
SOURCE: PCT Int. Appl., 86 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9919929	A1	19990422	WO 1998-US18211	19980902 <--

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5910378	A	19990608	US 1997-948627	199710

					10
			<--		
CA 2303208	AA	19990422	CA 1998-2303208		199809 02
			<--		
AU 9892159	A1	19990503	AU 1998-92159		199809 02
			<--		
EP 1021847	A1	20000726	EP 1998-944672		199809 02
			<--		
EP 1021847	B1	20020529			
R: DE, FR, GB, IT					
JP 2001520445	T2	20011030	JP 2000-516390		199809 02
			<--		
US 6183668	B1	20010206	US 1998-208695		199812 10
			<--		
US 6428584	B1	20020806	US 2000-711569		200011 13
			<--		
US 6432571	B1	20020813	US 2000-711238		200011 13
			<--		
US 6613106	B1	20030902	US 2000-711566		200011 13
			<--		
US 2003041444	A1	20030306	US 2002-212520		200208 05
			<--		
PRIORITY APPLN. INFO.:			US 1997-948627	A	199710 10
			<--		
			WO 1998-US18211	W	199809 02
			<--		
			US 1998-208695	A3	199812 10
			<--		
			US 2000-711569	A3	200011 13

AB Membrane electrode assemblies are described that include an ion conductive membrane, a catalyst adjacent to the major surfaces of the ion conductive membrane and a **porous** particle **filled** polymer membrane adjacent to the ion conductive

membrane. The catalyst can be disposed on the major surfaces of the ion conductive membrane. Preferably, the catalyst is disposed in nanostructures. The polymer film serving as the electrode backing layer preferably is **processed** by heating the particle loaded **porous** film to a temperature within about 20° of the m.p. of the polymer to decrease the Gurley value and the elec. resistivity. The MEAs can be **produced** in a continuous roll **process.** The MEAs can be used to **produce** fuel cells, **electrolyzers** and electrochem. reactors.

IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

ST membrane electrode assembly fuel cell; **electrolyzer membrane** electrode assembly; electrochem reactor membrane electrode assembly

IT **Conducting polymers**
Electrolysis catalysts
Electrolytic cells
Fuel cell electrodes
Fuel cells
Nanostructures
(**membrane** electrode assemblies)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:656249 HCAPLUS
DOCUMENT NUMBER: 129:284446
TITLE: **Electrolytic** solution-**impregnated porous membrane** conductor and its **manufacture**
INVENTOR(S): Kono, Kimikazu; Takida, Kotaro; Kaimai, Norimitsu
PATENT ASSIGNEE(S): Tonen Chemical Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 10269845	A2	19981009	JP 1997-91468	19970326 <--
JP 3586535	B2	20041110		
PRIORITY APPLN. INFO.:			JP 1997-91468	19970326 <--

AB The conductor comprises a nonprotonic **electrolytic** solution fixed in a polyolefin-based **microporous** membrane containing (A) a **graft copolymer** which is soluble in a nonprotonic **electrolytic** solution and (B) an electron-conductive material. The conductor is manufactured by

graft polymerizing a **polymer**, which is soluble in a nonprotonic **electrolytic** solution, on a electron-conductive material-containing polyolefin **microporous** membrane, followed by **impregnating** the **membrane** with a nonprotonic **electrolytic** solution The membrane works in a wide temperature range and shows long service life because of low vaporization speed of the impregnated **electrolytic** solution to be useful as batteries and electrodes.

IC ICM H01B001-12
ICS H05K009-00

CC 76-2 (Electric Phenomena)

ST **electrolytic** soln **impregnation porous membrane** conductor; **graft polymer** soly nonprotonic **electrolyte membrane**; electron conductor **porous membrane impregnation electrolyte**; polyolefin **porous membrane impregnation electrolytic** soln

IT Carbon black, uses
Petroleum coke
RL: TEM (Technical or engineered material use); USES (Uses)
(electron conductor; manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT **Polymers, processes**
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**graft**; manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT Electric conductors
Membranes, nonbiological
(manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT Polyolefins
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT **Electrolytic** solutions
(nonprotonic; manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT 21324-40-3, Lithium hexafluorophosphate
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**electrolyte**; manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

IT 135506-24-0P, Ethylene-methyl **acrylate graft copolymer**
RL: PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(manufacture of **electrolytic** solution-**impregnated porous membrane** conductor)

L43 ANSWER 5 OF 8 HCAPLUS
ACCESSION NUMBER: 1997:740158 HCAPLUS
DOCUMENT NUMBER: 128:24929
TITLE: Integral ion-exchange composite membranes

INVENTOR(S): Bahar, Bamdad; Hobson, Alex R.; Kolde, Jeffrey A.
PATENT ASSIGNEE(S): W.L. Gore & Associates, Inc., USA
SOURCE: PCT Int. Appl., 34 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9740924	A1	19971106	WO 1997-US7175	19970429 <--

W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
AU 9731163	A1	19971119	AU 1997-31163	19970429 <--

PRIORITY APPLN. INFO.: US 1996-15514P P 19960430 <--
WO 1997-US7175 W 19970429 <--

AB The membranes include a **microporous** polymeric sheet **impregnated** with a perfluoro ion-exchange material to **make** the micropores of the sheet occlusive and impermeable to fluids. The membranes are used in fuel cells as solid **electrolytes.**

IC ICM B01D069-12
ICS B01D071-06; B01D061-42

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST ion exchange composite membrane fuel cell; **electrolyte** ion exchange composite **membrane**; polymer perfluoro ion exchange material impregnated

IT Fuel cell **electrolytes**
(integral ion-exchange composite membranes for)

IT **Acrylic polymers**, uses
Fluoropolymers, uses
Polyamides, uses
Polycarbonates, uses
Polyolefins
RL: TEM (Technical or engineered material use); USES (Uses)
(integral ion-exchange composite membranes from perfluoro ion-exchange material-impregnated)

L43 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1996:97375 HCAPLUS

DOCUMENT NUMBER: 124:150921
TITLE: Electrodes, their **manufacture**, and fuel cells thereof
INVENTOR(S): Mizuno, Seiji
PATENT ASSIGNEE(S): Toyota Motor Co Ltd, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07326361	A2	19951212	JP 1994-142473 <--	19940531

PRIORITY APPLN. INFO.: JP 1994-142473 <-- 19940531

AB The electrodes are composed of a conductive gas **permeable** substrate and a water absorbing material. The water absorbing material is particles or short fibers of a water absorbing polymer or an inorg. compound, and is dispersed in the substrate or adhered to the substrate as a water absorbing sheet. The electrodes are **prepared** by mixing conductive particles or short fibers with particles or short fibers of the water absorbing material and press molding, or by **impregnating** conductive gas **permeable** substrate with the water absorbing material. 'The fuel cells have a solid polymer **electrolyte** **membrane** held between a cathode-anode pair with at least the cathode having the above described structure.

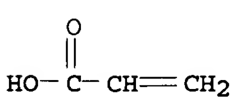
IT **9003-01-4D, Poly(acrylic** acid), salts
RL: DEV (Device component use); USES (Uses)
(electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer fuel cells)

RN 9003-01-4 HCAPLUS

CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7
CMF C3 H4 O2



IC ICM H01M004-86
ICS H01M004-88; H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST solid polymer **electrolyte** fuel cell cathode; water absorbing material fuel cell electrode

IT **9003-01-4D, Poly(acrylic** acid), salts
RL: DEV (Device component use); USES (Uses)

(electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer fuel cells)

L43 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1994:81679 HCAPLUS
DOCUMENT NUMBER: 120:81679
TITLE: Fuel cells using polymer **electrolytes**
INVENTOR(S): Iketani, Hirotoshi; Tsuruta, Shinji
PATENT ASSIGNEE(S): Tokyo Shibaura Electric Co, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 05283094	A2	19931029	JP 1992-103896	19920331 <--
PRIORITY APPLN. INFO.:			JP 1992-103896	19920331 <--

AB The fuel cells have a polymer **electrolyte** held between an anode and a cathode connected to each other by a water passage, where the water passage contains a water-impregnating material at the area contacting the electrode that generates water. The **electrolyte membrane** may contain water-retaining or -absorbing material. This arrangement eliminates the wetting and water-supplying systems required for conventional cells, and **makes** the fuel cells compact.
IC ICM H01M008-10
ICS H01M008-04; H01M008-06
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST polymer **electrolyte** fuel cell water control
IT Fuel cells
(polymer-**electrolyte**, water-retaining materials in, for compactness)
IT Phenolic resins, uses
RL: USES (Uses)
(water-**impregnating porous** material, in compact polymer **electrolyte** fuel cells)
IT 9003-04-7, Sodium **polyacrylate** 37291-07-9, Acrylonitrile-starch copolymer 60527-79-9, Sodium **acrylate** -starch **copolymer**
RL: USES (Uses)
(Nafion **electrolyte membranes** containing, for fuel cells)
IT 9002-89-5, Poly(vinyl alc.) 9004-32-4
RL: USES (Uses)
(crosslinked, Nafion **electrolyte membranes** containing, for fuel cells)
IT 7732-18-5, Water, miscellaneous
RL: MSC (Miscellaneous)
(retainers for, in polymer **electrolyte** fuel cells, for compactness)

IT 7631-86-9, Silica, uses
RL: USES (Uses)
(sol, Nafion **electrolyte membranes** containing poly(vinyl alc.) and, for fuel cells)

L43 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1985:221808 HCAPLUS
DOCUMENT NUMBER: 102:221808
TITLE: Anion-exchange membranes
PATENT ASSIGNEE(S): Asahi Chemical Industry Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 59219334	A2	19841210	JP 1983-92337	19830527 <--

PRIORITY APPLN. INFO.: JP 1983-92337 19830527 <--

AB An anion-exchange membrane with high alkali resistance is **prepared** by **impregnating** a fiber reinforced **microporous** sheet with an insol. crosslinked polymer containing a quaternary ammonium salt with attached alkyl, methacryl, vinylbenzyl, hydroxylalkyl, or hydroxyalkylene groups. Thus, Suntec S 360P (polyethylene) (I) [9002-88-4] containing powdered silicic acid and dioctyl phthalate was extruded to form a sheet then treated with CH_3CCl_3 and aqueous NaOH to give a 200-μ **microporous** I sheet with **porosity** 70% and average pore size 0.15 μ. The sheet was immersed in a 33% MeOH solution of 6:4 mol ratio allyldimethylammonioethyl methacrylate chloride-Me **methacrylate copolymer** [88677-69-4] containing 4% Bz_2O_2, cured at 120° for 10 min, and sandwiched between polypropylene nets (50 mesh, thickness 180 μ) at 130° and 4 kg/cm2 to give an anion exchange resin exhibiting resistance 0.95 Ω-cm2 in 31% aqueous NaOH solution at 23°, anion-exchange capacity 1.64 mequiv/g and anion transport number 0.984 between 0.2 and 0.1 M KCl solns. at 23°, compared with 0.95 Ω-cm2, 0.980, and 1.61 mequiv/g, resp., with weight loss 2.3% when the membrane was immersed in an alkaline solution for 50 days at 80°.
IC ICM C08J005-22
ICS B01J047-12
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 72
ST allyldimethylaminoethyl **methacrylate copolymer** anion exchanger; **porous** polyethylene anion exchange membrane; polypropylene fiber net reinforced membrane
IT **Electrolytic** cells
(**membranes** for, **microporous** polyethylene films **impregnated** with crosslinked quaternary ammonium salt-containing polymers as, alkali-resistant)
IT Anion exchangers

```
        (microporous polyethylene films impregnated
        with crosslinked quaternary ammonium salt-containing polymers
        reinforced with polypropylene nets, alkali-resistant)
IT   Alkali-resistant materials
        (microporous polyethylene films impregnated
        with crosslinked quaternary ammonium salt-containing polymers, for
        anion exchange membranes)
IT   88677-69-4
     RL: USES (Uses)
        (crosslinked, microporous polyethylene films
        impregnated with, polypropylene nets-reinforced, for
        anion-exchange membranes, alkali-resistant)


Search request IV

=> d l48 ibib abs hitstr hitind 1-3

L48  ANSWER 1 OF 3  HCAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:          2000:646292  HCAPLUS
DOCUMENT NUMBER:           133:225582
TITLE:                     Electrolyte membranes for fuel
                           cells, their manufacture, fuel
                           cells, and manufacture of the
                           fuel cells
INVENTOR(S):               Yamaguchi, Takeo; Nakao, Shinichi
PATENT ASSIGNEE(S):        Center for Advanced Science and Technology
                           Incubation, Ltd., Japan
SOURCE:                    PCT Int. Appl., 20 pp.
                           CODEN: PIXXD2
DOCUMENT TYPE:             Patent
LANGUAGE:                  Japanese
FAMILY ACC. NUM. COUNT:    1
PATENT INFORMATION:

     PATENT NO.             KIND    DATE        APPLICATION NO.          DATE
     ---------------        ----    --------    --------------------
     --------
     WO 2000054351           A1     20000914    WO 2000-JP1370
                                                                         200003
                                                                         07
                                                     <--
         W:  AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR,
             CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
             ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
             LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,
             SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,
             VN, YU, ZA, ZW
         RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
             DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF,
             BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     AU 2000028310           A5     20000928    AU 2000-28310
                                                                         200003
                                                                         07
                                                     <--
     EP 1202365              A1     20020502    EP 2000-906746
                                                                         200003
                                                                         07
                                                     <--
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
```

PT, IE, SI, LT, LV, FI, RO, MK, CY, AL

PRIORITY APPLN. INFO.: JP 1999-60817 A 19990308 <--
WO 2000-JP1370 W 20000307

AB The **electrolyte** membranes have a proton conductive polymer filled in the pores fo a **porous** substrate not swellable by MeOH or H2O. The substrate is an **inorg.** material or a **heat** resistant **polymer.** The membranes are prepared by irradiating the **porous** substrate with an energy beam and contacting the substrate with a monomer to form the polymer. The **fuel cells** have the **electrolyte** membrane formed on the catalyst layers of their cathodes or anodes, and are prepared by applying sol on an electrode, converting the sol layer to a **porous** substrate film, filling the pores in the film with the proton conductive polymer, and laminating with the other electrode.

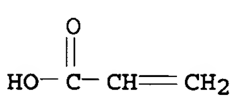
IT **9003-01-4, Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)

RN 9003-01-4 HCAPLUS

CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7
CMF C3 H4 O2



IC ICM H01M008-02
ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell** proton conductive polymer **electrolyte**; polymer **electrolyte porous** substrate **fuel cell**

IT Plasma
(argon plasma in manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)

IT **Fuel cell electrolytes**
(manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)

IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel**

cells)

IT 9002-84-0, Teflon **9003-01-4**, **Polyacrylic** acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)

IT 7440-37-1, Argon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of polymer **electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1997:633024 HCAPLUS
DOCUMENT NUMBER: 127:280797
TITLE: Solid polymer ionic conductors and **fuel cells** using the conductors as **electrolytes**
INVENTOR(S): Okada, Tatsuhiro; Sha, Takeshi; Arimura, Tomoaki; Yamazaki, Hiroaki
PATENT ASSIGNEE(S): Agency of Industrial Sciences and Technology, Japan; Japan Vilene Co., Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09251857	A2	19970922	JP 1996-59533 <--	19960315
JP 3035885	B2	20000424		
PRIORITY APPLN. INFO.:			JP 1996-59533 <--	19960315

AB The conductors contain water absorbing **porous inorg.** particles, having diam 0.1 μm-3 mm, dispersed in an ion exchanger polymer matrix. The **inorg.** particles are selected from SIO_2 gel, synthetic zeolite, Al_2O_3 gel, TiO_2 gel, ZrO_2 gel, and Y_2O_3 gel; the ion exchanger is selected from perfluoro sulfonic acid polymer, polysulfone, perfluoro carboxylic acid **polymer**, sulfonated polystyrene, trifluoroethylene **grafted** fluorocarbon matrix, and polyvinylsulfonic acid. The **fuel cells** use the conductors as **electrolytes**.

IC ICM H01M008-02
ICS C08K007-22; C08L101-02; H01B001-06

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell** polymer **electrolyte inorg** particle

IT Fluoropolymers, uses
Polysulfones, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polymer ionic conductors containing dispersed water absorbing **porous inorg.** particles for **fuel cell electrolytes**)

IT 359-11-5D, Trifluoroethylene, **graft copolymer** with fluorocarbon **polymers** 26101-52-0, Poly(vinylsulfonic acid) 66796-30-3, Nafion 117
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polymer ionic conductors containing dispersed water absorbing **porous inorg.** particles for **fuel cell electrolytes**)

IT 1314-23-4, Zirconia, uses 1314-36-9, Yttria, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titania, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polymer ionic conductors containing dispersed water absorbing **porous inorg.** particles for **fuel cell electrolytes**)

IT 9003-53-6, Polystyrene
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sulfonated; polymer ionic conductors containing dispersed water absorbing **porous inorg.** particles for **fuel cell electrolytes**)

L48 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:97375 HCAPLUS
DOCUMENT NUMBER: 124:150921
TITLE: Electrodes, their manufacture, and **fuel cells** thereof
INVENTOR(S): Mizuno, Seiji
PATENT ASSIGNEE(S): Toyota Motor Co Ltd, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp. CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07326361	A2	19951212	JP 1994-142473	19940531

<--

PRIORITY APPLN. INFO.: JP 1994-142473 19940531

<--

AB The electrodes are composed of a conductive gas **permeable** substrate and a water absorbing material. The water absorbing material is particles or short fibers of a water absorbing polymer or an **inorg.** compound, and is dispersed in the substrate or adhered to the substrate as a water absorbing sheet. The electrodes are prepared by mixing conductive particles or short fibers with particles or short fibers of the water absorbing material and press

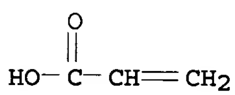
molding, or by impregnating conductive gas **permeable** substrate with the water absorbing material. 'The **fuel cells** have a solid polymer **electrolyte** membrane held between a cathode-anode pair with at least the cathode having the above described structure.

IT **9003-01-4D, Poly(acrylic** acid), salts
RL: DEV (Device component use); USES (Uses)
(electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer **fuel cells**)

RN 9003-01-4 HCAPLUS
CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7
CMF C3 H4 O2



IC ICM H01M004-86
ICS H01M004-88; H01M008-02; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST solid polymer **electrolyte fuel cell** cathode; water absorbing material **fuel cell** electrode
IT Carbon fibers, uses
RL: DEV (Device component use); USES (Uses)
(electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer **fuel cells**)
IT Electrodes
(**fuel-cell**, electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer **fuel cells**)
IT **9003-01-4D, Poly(acrylic** acid), salts
RL: DEV (Device component use); USES (Uses)
(electrodes containing carbon fiber substrates and water absorbing polymers for solid polymer **fuel cells**)

Search request V

=> d l57 ibib abs hitstr hitind 1-11

L57 ANSWER 1 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:421254 HCAPLUS
DOCUMENT NUMBER: 135:21972
TITLE: **Polymer** solid **electrolyte fuel cell electrodes** and their **manufacture**
INVENTOR(S): Hidai, Shouichi; Aoki, Tsutomu
PATENT ASSIGNEE(S): Toshiba Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001160406	A2	20010612	JP 1999-346145	19991206 <--

PRIORITY APPLN. INFO.: JP 1999-346145 19991206 <--

AB The **electrode** comprises a water repellent support having a catalyst layer obtained by filling the support pores with carbon-supported noble metal catalyst powder and impregnation of the support with **electrolyte** solns. The thickness of the catalyst layer unified with a solid **electrolyte** layer is smaller than that of the support. The **electrodes** are manufactured by (a) treatment of a support to give water repellency, (b) **impregnation** of the **porous** support with a slurry containing carbon-supported noble metal catalyst powder, **polymer electrolyte solution**, and a dilution solvent, and (c) evaporation and removal of the dilution solvent. The **electrodes** have high strength.

IC ICM H01M008-02
ICS H01M004-86; H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST **polymer electrolyte fuel cell electrode**; catalyst contg **porous electrode** waterproof support

IT Catalysts
Fuel cell electrodes
(manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT Noble metals
RL: DEV (Device component use); USES (Uses)
(manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(water repellent coating; manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT Coating materials
(water-resistant; manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT 7440-44-0, Carbon, uses
RL: CAT (Catalyst use); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(catalyst support and **electrode** support coated with;

manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT 12705-37-2, Chromium nitride 25583-20-4, Titanium nitride
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**electrode** support coated with; manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

IT 12597-68-1, stainless steel, uses 322012-68-0, TGP-H-090
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**electrode** support; manufacture of **polymer electrolyte fuel cell electrodes** comprising water-repellent **porous** supports **filled** with carbon-supported noble metal catalysts)

L57 ANSWER 2 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:646292 HCAPLUS
DOCUMENT NUMBER: 133:225582
TITLE: **Electrolyte** membranes for **fuel cells**, their **manufacture**, **fuel cells**, and **manufacture** of the **fuel cells**
INVENTOR(S): Yamaguchi, Takeo; Nakao, Shinichi
PATENT ASSIGNEE(S): Center for Advanced Science and Technology Incubation, Ltd., Japan
SOURCE: PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000054351	A1	20000914	WO 2000-JP1370	20000307 <--

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
AU 2000028310	A5	20000928	AU 2000-28310	20000307 <--
EP 1202365	A1	20020502	EP 2000-906746	

200003
07
<--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL
PRIORITY APPLN. INFO.: JP 1999-60817 A
199903
08
<--
WO 2000-JP1370 W
200003
07

AB The **electrolyte** membranes have a proton conductive **polymer** filled in the pores fo a **porous** substrate not swellable by MeOH or H2O. The substrate is an inorg. material or a heat resistant **polymer.** The membranes are **prepared** by irradiating the **porous** substrate with an energy beam and contacting the substrate with a monomer to form the **polymer.** The **fuel cells** have the **electrolyte** membrane formed on the catalyst layers of their cathodes or anodes, and are **prepared** by applying **sol** on an **electrode**, converting the **sol** layer to a **porous** substrate film, **filling** the pores in the film with the proton conductive **polymer**, and laminating with the other **electrode.**

IC ICM H01M008-02
ICS H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **fuel cell** proton conductive **polymer electrolyte; polymer electrolyte porous** substrate **fuel cell**
IT Plasma
(argon plasma in manufacture of **polymer electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)
IT **Fuel cell electrolytes**
(manufacture of **polymer electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)
IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **polymer electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)
IT 9002-84-0, Teflon 9003-01-4, Polyacrylic acid
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **polymer electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)
IT 7440-37-1, Argon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of **polymer electrolyte** membranes containing heat resistant **porous** substrates for **fuel cells**)
REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L57 ANSWER 3 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:561019 HCAPLUS
DOCUMENT NUMBER: 133:166244
TITLE: **Fuel cell electrodes** and their **manufacture**
INVENTOR(S): Hitomi, Shuji
PATENT ASSIGNEE(S): Japan Storage Battery Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp. CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000228206	A2	20000815	JP 1999-29045	19990205
DE 10004955	A1	20000817	DE 2000-10004955	20000204 <--

PRIORITY APPLN. INFO.:

JP 1999-29045	A	19990205 <--
JP 1999-78885	A	19990324 <--
JP 1999-78889	A	19990324 <--

AB The **electrodes** have a catalyst layer, containing a **polymer electrolyte** and catalyst particles, and a gas diffusion layer containing a conductive **porous** material, which contains a fluorinated **porous** fluoropolymer. The **electrodes** are **prepared** by dissolving a fluoropolymer in a 1st solvent, **impregnating** a conductive **porous** material in the **solution**, immersing the **porous** material in a 2nd solvent miscible with the 1st solvent but insol. fo the fluoropolymer to form a **porous** fluoropolymer in the **porous** material, and fluorinating the **porous** fluoropolymer.

IC ICM H01M004-96
ICS H01M004-88
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **fuel cell electrode** gas diffusion layer fluoropolymer
IT Carbon fibers, uses
RL: DEV (Device component use); USES (Uses)
(catalytic **electrodes** with fluorinated **porous** fluoropolymer coated carbon gas diffusion layers for **fuel cells**)
IT **Fuel cell electrodes**
(structure and manufacture of **electrodes** with fluorinated

porous fluoropolymer coated carbon gas diffusion layers for **fuel cells**)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(catalytic **electrodes** with fluorinated **porous** fluoropolymer coated carbon gas diffusion layers for **fuel cells**)

IT 9011-17-0D, Hexafluoropropylene-vinylidene fluoride **copolymer**, **porous**, fluorinated
RL: DEV (Device component use); USES (Uses)
(catalytic **electrodes** with fluorinated **porous** fluoropolymer coated carbon gas diffusion layers for **fuel cells**)

IT 7782-41-4, Fluorine, uses
RL: NUU (Other use, unclassified); USES (Uses)
(in manufacture of **electrodes** with fluorinated **porous** fluoropolymer coated carbon gas diffusion layers for **fuel cells**)

L57 ANSWER 4 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:420559 HCAPLUS
DOCUMENT NUMBER: 133:32683
TITLE: **Fuel cell electrodes** and their **manufacture**
INVENTOR(S): Hitomi, Shuji
PATENT ASSIGNEE(S): Japan Storage Battery Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
JP 2000173624	A2	20000623	JP 1999-78885 <--		19990324
DE 10004955	A1	20000817	DE 2000-10004955 <--		20000204
PRIORITY APPLN. INFO.:			JP 1998-296157 <--	A	19981003
			JP 1999-29045 <--	A	19990205
			JP 1999-78885 <--	A	19990324
			JP 1999-78889 <--	A	19990324

AB The **electrodes** have a catalyst layer containing a solid **polymer electrolyte** on a **porous** conductive substrate, where the substrate contains a **porous resin.** The **electrodes** are **prepared** by: **impregnating** a **porous** conductive material with a **solution** of a **resin** dissolved in a 1st solvent, immersing the impregnated material in a 2nd solvent miscible with the 1st solvent but insol. for the **resin** to form a **porous resin** layer on the material, and joining the material with an **electrolyte** containing catalyst layer.

IC ICM H01M004-86
ICS H01M004-88; H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell electrode polymer electrolyte** catalyst layer; **porous polymer** conductive substrate **fuel cell electrode** manuf

IT **Fuel cell electrodes**
(structure and manufacture of **fuel cell electrodes** containing **polymer electrolyte** -catalyst layer on **porous polymer** coated carbon substrates)

IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(structure and manufacture of **fuel cell electrodes** containing **polymer electrolyte** -catalyst layer on **porous polymer** coated carbon substrates)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(structure and manufacture of **fuel cell electrodes** containing **polymer electrolyte** -catalyst layer on **porous polymer** coated carbon substrates)

IT 7440-44-0, Carbon, uses 24937-79-9, Poly(vinylidene fluoride)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(structure and manufacture of **fuel cell electrodes** containing **polymer electrolyte** -catalyst layer on **porous polymer** coated carbon substrates)

L57 ANSWER 5 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:444262 HCAPLUS
DOCUMENT NUMBER: 127:68474
TITLE: **Fuel cells** with $H_3PW_{12}O_{40}.29H_2O$ as solid **electrolyte**
AUTHOR(S): Staiti, P.; Hocevar, S.; Giordano, N.
CORPORATE SOURCE: CNR Institute Transformation and Storage Energy, Lucia Messina, 98126, Italy
SOURCE: International Journal of Hydrogen Energy (**1997**), 22(8), 809-814
CODEN: IJHEDX; ISSN: 0360-3199
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Electrochem. activity tests were performed on a **fuel cell** fed with H2/O2 at room temperature utilizing phosphotungstic acid (PWA) as solid **electrolyte.** Two different

procedures were followed to prepare the **electrolyte** layers. The first **procedure** consisted of mixing the precursor of a silicone **polymer** with the crystalline powder of the PWA in an agate mortar and spreading the paste on a glass surface or on the surface of an **electrode**; the **polymerization** occurred with the layer already formed. A composite elastic material which held the acid entrapped in the pores of the **polymer** was obtained. The second **procedure** consisted of **impregnating** an inert **porous** material with a concentrate **solution** of PWA for a longer time to obtain a flat layer after successive drying. A stiff and undeformable material reinforced by the **porous** matrix was obtained by this **method.** Poor **fuel cell** electrochem. performances were obtained with the composite **electrolyte** layer principally due to the high protonic internal resistance. Moreover, the **polymeric** skeleton was unstable under the working conditions of the cell. Maximum power d. of 0.075 W/cm2 was obtained at 0.2 A/cm2 with the **electrolyte** layer formed by 70 weight% PWA and 30 weight% silicone **polymer.** Better electrochem. **fuel cell** performance was obtained with the reinforced **electrolyte** layer containing glass microfibers **prepared** by the second **method.** Using this type of **fuel cell,** c.d. of 0.45 and 2.0 A/cm2 at cell potential of 0.6 and 0.33 V, resp., power d. of 0.738 W/cm2 at 1.8 A/cm2 and a Tafel slope of 0.058 V/decade were obtained.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **fuel cell** phosphotungstic acid solid **electrolyte**
IT **Fuel cell electrolytes**
  Fuel cells
    (**fuel cells** with phosphotungstic acid as solid **electrolyte**)
IT Silicone rubber, uses
  RL: DEV (Device component use); USES (Uses)
    (**fuel cells** with solid **electrolyte** of composite of phosphotungstic acid and)
IT Glass fibers, uses
  RL: DEV (Device component use); USES (Uses)
    (microfibers; **fuel cells** with solid **electrolyte** of phosphotungstic acid reinforced with)
IT 1343-93-7, Phosphotungstic acid ($H_3PW_{12}O_{40}$)
  RL: DEV (Device component use); USES (Uses)
    (**fuel cells** with phosphotungstic acid as solid **electrolyte**)

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L57 ANSWER 6 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1997:421167 HCAPLUS
DOCUMENT NUMBER: 127:53424
TITLE: **Manufacture** of **electrodes** for solid **polymer electrolyte fuel cells**
INVENTOR(S): Hamada, Akira; Miyake, Yasuo
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent

LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09120821	A2	19970506	JP 1995-280441	19951027 <--

PRIORITY APPLN. INFO.: JP 1995-280441 19951027 <--

AB In the manufacture of the **electrodes** by mixing **electrode** catalyst with polytetrafluoroethylene and a pore forming agent, molding the mixture into sheets, removing the agent to form pores, and **impregnating** the **porous** sheets with a **polymer electrolyte solution**; the molded.sheets are stacked on **porous** substrate and heat treated at a temperature above the m.p. of polytetrafluoroethylene before the impregnation.

IC ICM H01M004-88
ICS H01M008-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **polymer electrolyte fuel cell electrode** manuf; polytetrafluoroethylene **fuel cell electrode** manuf

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fluorine- and sulfo-containing, ionomers; manufacture of **porous polymer electrolyte impregnated electrodes** for **fuel cells**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fluorine-containing, sulfo-containing, ionomers; manufacture of **porous polymer electrolyte impregnated electrodes** for **fuel cells**)

IT Carbon black, uses
Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **porous electrodes** containing platinum laden carbon black and polytetrafluoroethylene binder for solid **polymer electrolyte fuel cells**)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; manufacture of **porous polymer electrolyte impregnated electrodes** for **fuel cells**)

IT Ionomers
RL: DEV (Device component use); PEP (Physical, engineering or

chemical process); PROC (Process); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; manufacture of **porous polymer electrolyte impregnated electrodes** for **fuel cells**)

IT **Fuel cell electrodes**
(pore forming agent manufacture of **porous electrodes** for solid **polymer electrolyte fuel cells**)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **porous electrodes** containing platinum laden carbon black and polytetrafluoroethylene binder for solid **polymer electrolyte fuel cells**)

IT 9002-84-0, Polytetrafluoroethylene
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of **porous electrodes** containing platinum laden carbon black and polytetrafluoroethylene binder for solid **polymer electrolyte fuel cells**)

IT 471-34-1, Calcium carbonate, uses 1066-33-7, Ammonium bicarbonate
RL: NUU (Other use, unclassified); USES (Uses)
(pore forming agent manufacture of **porous electrodes** for solid **polymer electrolyte fuel cells**)

L57 ANSWER 7 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:81679 HCAPLUS
DOCUMENT NUMBER: 120:81679
TITLE: **Fuel cells** using **polymer electrolytes**
INVENTOR(S): Iketani, Hirotoshi; Tsuruta, Shinji
PATENT ASSIGNEE(S): Tokyo Shibaura Electric Co, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 05283094	A2	19931029	JP 1992-103896	19920331 <--

PRIORITY APPLN. INFO.: JP 1992-103896 19920331 <--

AB The **fuel cells** have a **polymer electrolyte** held between an anode and a cathode connected to each other by a water passage, where the water passage contains a water-impregnating material at the area contacting the **electrode** that generates water. The **electrolyte** membrane may contain water-retaining or -absorbing material. This

arrangement eliminates the wetting and water-supplying systems required for conventional cells, and **makes** the **fuel cells** compact.

IC ICM H01M008-10
ICS H01M008-04; H01M008-06
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **polymer electrolyte fuel cell**
water control
IT **Fuel cells**
(**polymer-electrolyte**, water-retaining materials in, for compactness)
IT Phenolic **resins**, uses
RL: USES (Uses)
(water-**impregnating porous** material, in compact **polymer electrolyte fuel cells**)
IT 9003-04-7, Sodium polyacrylate 37291-07-9, Acrylonitrile-starch **copolymer** 60527-79-9, Sodium acrylate-starch **copolymer**
RL: USES (Uses)
(Nafion **electrolyte** membranes containing, for **fuel cells**)
IT 9002-89-5, Poly(vinyl alc.) 9004-32-4
RL: USES (Uses)
(crosslinked, Nafion **electrolyte** membranes containing, for **fuel cells**)
IT 7732-18-5, Water, miscellaneous
RL: MSC (Miscellaneous)
(retainers for, in **polymer electrolyte fuel cells**, for compactness)
IT 7631-86-9, Silica, uses
RL: USES (Uses)
(**sol**, Nafion **electrolyte** membranes containing poly(vinyl alc.) and, for **fuel cells**)

L57 ANSWER 8 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1970:106578 HCAPLUS
DOCUMENT NUMBER: 72:106578
TITLE: **Electrode** with a hydrophobic **electrolyte** surface
INVENTOR(S): Baker, Michael Peter; Demoully, Thomas R.
PATENT ASSIGNEE(S): General Electric Co.
SOURCE: Ger. Offen., 28 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 1931977		19700226	DE 1969-1931977	19690624 <--
FR 2014206			FR	

PRIORITY APPLN. INFO.: US 19680625

<--

AB An apparatus for impregnating carriers with catalytically active material consists of a flask, a vacuum pump, a recirculating pump, and a filter funnel provided with a **perforated** plate. The electronically conductive carrier having **porosity** of 25-90%, pore size (1-15) + 10-3 mm, and thickness 10 times greater than the pore diameter is placed on the **perforated** plate, and a dispersion containing the active material (particle size <0.1 + 10-3 mm) is recycled while maintaining the pressure in the flask at 0.5-0.9 atmospheric After compression, the carrier on the **electrolyte** side is impregnated with linear hydrophobic **polymers** having a critical surface tension <32 dynes/cm. The carrier is placed on a substrate maintained at 232-344° and the **polymer** is sprayed on the other surface at a rate less than the **penetration** rate of the liquid The total weight of the hydrophobic agent should be 1-7% of the total structure. Thus, **porous** Ni substrate having pore size of 12.5 + 10-3 mm and **porosity** of 81% is **impregnated** with 2.6 mg/cm2 of a mixture of 31% Pd black and 69% Pt black while maintaining the pressure in the flask at 635 mm Hg. After drying for 1 hr at 110°, the structure is compressed by 39% at room temperature The **electrode** on the **electrolyte** side is sprayed with 3.8% Teflon-30 **solution** while the other side is maintained at 232°. The **electrode** having a coating of 2.30 mg/cm2 is heated for 10 min at 340° and then coated with 1.11 mg/cm2 on the other side resulting in total coating thickness of 3.41 mg/cm2. A cell containing the **prepared electrode** , Mg anode, and 7% NaCl **electrolyte** has an initial voltage of 1.11 V at 40 A/ft2 and 1.01 V at the same c.d. after 25 days.

IC H01M

CC 77 (Electrochemistry)

ST hydrophobic **electrodes**; nickel sinter hydrophobic **electrodes**; **electrodes** hydrophobic

IT **Fuel cells**
   (cathodes, nickel, with palladium-platinum catalysts)

IT Cathodes
   (**fuel-cell**, nickel, with palladium-platinum catalysts)

IT 7440-05-3, uses and miscellaneous 7440-06-4, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
   (catalysts, for **fuel-cell** cathodes)

L57 ANSWER 9 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1970:38304 HCAPLUS
DOCUMENT NUMBER: 72:38304
TITLE: **Microporous polymer product**
INVENTOR(S): Grubb, Willard T.; Macur, Robert A.
PATENT ASSIGNEE(S): General Electric Co.
SOURCE: Ger. Offen., 22 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

DE 1925283 19691127 DE 1969-1925283 19690517 <--
FR 2008947 FR
PRIORITY APPLN. INFO.: US 19680520 <--

AB Solns. of olefin **polymers** in waxes, containing 40-90% (based on total **solution**) waxes, are used to form objects from which the wax is then dissolved, giving a **microporous** object. Thus, a homogeneous **solution** was **prepared** by heating and stirring a 3:7 mixture of polyethylene (I) and paraffin wax and was applied to the gas side of a Ag-activated **electrode** in the form of a Ni plate to coat and impregnate the **electrode**. The wax was dissolved from the **polymer** with n-heptane, giving an **electrode** with an **impregnated**, white, hydrophobic **microporous** layer on 1 surface. This **electrode** was used as an air **electrode** in a half cell vs. a H **electrode** as a reference **electrode** in an **electrolyte** of 13N KOH and 6M MeOH fuel. Voltage at 0 current was 1.08 V and at 40 mA, 0.73 V. A mixture of 14 g microcryst. wax and 6 g powdered I (d. 0.915) was heated to form a homogeneous **solution**, cast into an 0.06-cm film on a glass plate, cooled to room temperature, placed in n-heptane to dissolve out the wax, and dried 1 hr in air at room temperature, giving a sheet which had an intense white appearance and which absorbed and was **penetrated** by <2% of light in the visible range. A 1:1 I-wax composition was poured over a foamed Ni with **porosity** 95%, cooled, and immersed 48 hr in n-heptane to give a **microporous** piece of I reinforced throughout its volume with Ni fibers. Immersing this object 48 hr in 6N HNO3 gave a **microporous** I containing a 3-dimensional network of large pores formed by the removal of the Ni fibers. **Microporous** compns. were also **prepared** from polypropylene and poly(2-methyl-1-pentene) and were used to coat the insides of **porous** carbon beakers used as full cell **electrodes**. This **method** is simple and gives **products** with extremely high diffuse reflectance.

IC C08F

CC 77 (Electrochemistry)

ST **polymer** air **electrode**; olefin **polymer** air **electrode**; **electrode** air **electrode**; **electrode** air **microporous**; silver **electrode** air **microporous**; methanol **fuel cell**; **fuel cell** methanol

IT **Fuel cells**
(**electrodes**, coated and impregnated with olefin **polymers**, for **microporosity**)

IT **Electrodes**
(**fuel-cell**, coated and impregnated with olefin **polymers**, for **microporosity**)

IT Coating materials
(olefin **polymer**, on **electrodes** for **microporous** surface)

IT 9002-88-4, uses and miscellaneous 9003-07-0, uses and miscellaneous 26655-13-0
RL: USES (Uses)
(coating with, of **fuel-cell**

electrodes, for **microporosity**)

L57 ANSWER 10 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1965:422225 HCAPLUS
DOCUMENT NUMBER: 63:22225
ORIGINAL REFERENCE NO.: 63:3902b-c
TITLE: **Porous**, palladium-**impregnated**, **fuel cell electrode**
INVENTOR(S): Duddy, Joseph C.
PATENT ASSIGNEE(S): Electric Storage Battery Co.
SOURCE: 3 pp.
DOCUMENT TYPE: Patent
LANGUAGE: Unavailable
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 3181973		19650504	US 1960-78833	19601228 <--
DE 1194935			DE	

AB The **fuel cell electrode** that delivered 40 amp./ft.2 at 420 mv. polarization on a fuel comprised of 10 parts by weight of EtOH and 90 parts by weight of a 27% KOH **solution** was **prepared** by first intimately mixing 1 part by weight of poly(ethylene oxide) and 1 part by weight of polyethylene in this plasticized state at 275°F., adding 16 parts by weight finely divided Ag and 1.7 parts by weight of impalpable PdO. The mixture was pelletized at room temperature after proper mixing and extruded at 225°F. as a 3/16-in.-diameter rod on a 1/32-in.-diameter Ag wire. The **electrode** was then placed in a 7% **solution** of KOH and the PdO **electrolyzed** cathodically against a Ni **electrode** and converted to Pd. This reduction was supported by the swelling of the poly(propylene oxide) which adsorbed enough **electrolyte** to increase the **electrode** conductivity Upon washing the **electrode** with H2O, the poly(propylene oxide) was partially removed, thus increasing the surface area exposed to the fuel and **electrolyte.**

INCL 136120000

CC 15 (Electrochemistry)

IT **Electrodes**
(**fuel-cell**, **porous**, Pd-**impregnated**, containing ethylene oxide **polymers**, ethylene **polymers** and Ag)

IT Catalysts and Catalysis
(in **fuel cells**, Pd-impregnated **electrodes** as)

IT 7440-05-3, Palladium
(**electrodes** (**porous**) from ethylene oxide **polymers**, ethylene **polymers**, Ag and, for **fuel cells**)

IT 9002-88-4, Ethylene **polymers** 25322-68-3, Ethylene oxide, **homopolymer**
(**electrodes** containing Pd and, for **fuel cells**)

IT 64-17-5, Ethyl alcohol

(**fuel cells** using, Pd-impregnated **electrodes** for)

L57 ANSWER 11 OF 11 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1963:453158 HCAPLUS
DOCUMENT NUMBER: 59:53158
ORIGINAL REFERENCE NO.: 59:9600e-f
TITLE: **Fuel cell electrode**
INVENTOR(S): McEvoy, James E.; Shalit, Harold
PATENT ASSIGNEE(S): Air Products and Chemicals, Inc.
SOURCE: 6 pp.
DOCUMENT TYPE: Patent
LANGUAGE: Unavailable
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 3097974		19630716	US 1960-67521	19601107
			<--	
GB 995151			GB	

AB A **fuel cell electrode** is **prepd** . by coating a suitable **porous electrode** body (i.e. of C) with a liquid suspension of fine, activated C impregnated with a noble metal catalyst such as $PdCl_2$ or H_2PtCl_6 and dried at room temperature It is then coated with a semi-sealing agent which does not inhibit **electrolytic** transport. Typical fuels which can be used in the cell are H_2, alc., hydrocarbons, and carbonyl compds. For example, 80-95 parts of -200 mesh C, with surface area of 1000 m.2/g., is mixed with an amount of an aqueous H_2PtCl_6 **solution** containing 5-20 parts Pt. Excess liquid is removed and the powder is dried. A suspension in acetone of the impregnated C is introduced by deposition into the pores of a thin **porous electrode** matrix having an average pore diameter greater than the particle range of the powder. The matrix is dried and coated with a sealing agent such as Si **polymers**, fluorocarbons, and polystyrenes. The Pt is obtained by reduction by passing H_2 or MeOH over the powder or the impregnated **electrode.** The final **electrode** contains 0.1-5.0% Pt.

INCL 136120000

CC 15 (Electrochemistry)

IT **Electrodes**
(**fuel-cell**, with **porous electrode** body and activated C suspension containing noble metal catalysts)

IT 7440-44-0, Carbon
(catalysts from noble metals and, **impregnation** of **porous electrode** body with, for **fuel cells**)

IT 7647-10-1, Palladium chloride, $PdCl_2$
(**electrode (porous) impregnation** with activated C suspension containing, for **fuel cells**)

IT 16941-12-1, Hydrogen hexachloroplatinate(IV)
(**impregnation** of **porous electrode** bodies with activated C suspension containing, for fuelcells)

Search request VI

=> d l60 ibib abs hitstr hitind 1-7

L60 ANSWER 1 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2006:823308 HCAPLUS
DOCUMENT NUMBER: 145:233159
TITLE: Solid polymer **electrolyte** composite **membrane** comprising **porous** **ceramic** support for electrochemical cells
INVENTOR(S): Mittelsteadt, Cortney K.; Laconti, Anthony B.
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 12pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006183011	A1	20060817	US 2005-239647	20050929

PRIORITY APPLN. INFO.:	US 2004-614143P P	20040929

AB The invention concerns a solid polymer **electrolyte** composite **membrane** and method of manufacturing the same. The composite membrane comprises a **porous ceramic** support having a top surface and a bottom surface. The **porous ceramic** support may be formed by laser micromachining a **ceramic** sheet or may be formed by electrochem. oxidizing a sheet of the base metal. A solid polymer **electrolyte** fills the pores of the **ceramic** support and preferably also covers the top and bottom surfaces of the support. Application of the solid polymer **electrolyte** to the **porous** support may take place by applying a dispersion to the support followed by a drying off of the solvent, by hot extrusion of the solid polymer **electrolyte** (or by hot extrusion of a precursor of the solid polymer **electrolyte** followed by in-situ conversion of the precursor to the solid polymer **electrolyte**) or by in-situ polymerization of a corresponding monomer of the solid polymer **electrolyte.**
INCL 429030000; 429033000; 427115000; 205538000; 528391000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 57, 72, 76
ST polymer **electrolyte** composite **membrane** **ceramic** support electrochem cell; fuel cell polymer **electrolyte** composite **membrane** **ceramic** support
IT Coating materials
(diamond-like; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)
IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)

(fluorine- and sulfo-containing, ionomers; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Compressors
Concentrators
(gas; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Micromachining
(laser; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Sulfonic acids, uses
RL: DEV (Device component use); USES (Uses)
(perfluorosulfonic acid polymers; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Fuel cells
(polymer **electrolyte**; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT **Ceramics**
(**porous**, supports; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Capacitors
Electrolytic cells
Ion exchangers
Ionic **conductivity**
Sensors
(solid **polymer electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(sulfo-containing, perfluoro; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT **Glass**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(supports; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT Oxides (**inorganic**), uses
RL: TEM (Technical or engineered material use); USES (Uses)
(valve metal, sintered; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT 1314-35-8, Tungsten oxide, uses
RL: TEM (Technical or engineered material use); USES (Uses)

(silica-impregnated; solid polymer **electrolyte** composite **membrane** comprising **porous** **ceramic** support for electrochem. cells)

IT 288-32-4, Imidazole, uses
RL: MOA (Modifier or additive use); USES (Uses)
(solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7782-40-3, Diamond, uses 12069-32-8, Boron carbide 13463-67-7, Titania, uses 14808-60-7, Quartz, uses 107992-37-0, Silicon carbide (Si0-1C0-1)
RL: TEM (Technical or engineered material use); USES (Uses)
(supports; solid polymer **electrolyte** composite **membrane** comprising **porous ceramic** support for electrochem. cells)

L60 ANSWER 2 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:358666 HCAPLUS
DOCUMENT NUMBER: 144:373097
TITLE: Method of fabrication of polymer **electrolyte** for a direct oxidation fuel cell
INVENTOR(S): Song, Min-Kyu; Kim, You-Mee; Kweon, Ho-Jin; Rhee, Hee-Woo
PATENT ASSIGNEE(S): Samsung Sdi Co., Ltd., S. Korea
SOURCE: Eur. Pat. Appl., 32 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
EP 1648047	A1	20060419	EP 2005-109576		20051014
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU					
KR 2006048562	A	20060518	KR 2005-55834		20050627
JP 2006114502	A2	20060427	JP 2005-299086		20051013
CN 1764001	A	20060426	CN 2005-10113723		20051014
US 2006251945	A1	20061109	US 2005-251579		20051014
PRIORITY APPLN. INFO.:			KR 2004-82155	A	20041014
			KR 2005-55834	A	200506

AB A polymer **electrolyte membrane** for a direct
oxidation fuel cell includes a **porous** polymer supporter
having a plurality of pores, and a hydrocarbon fuel diffusion
barrier layer which is formed on the polymer supporter and contains
an **inorg.** additive dispersed in a cation exchange resin.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST polymer **electrolyte** direct oxidn fuel cell

IT Amines, uses
Quaternary ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(C1-20; method of fabrication of polymer **electrolyte**
for direct oxidation fuel cell)

IT Mica-group minerals, uses
RL: MOA (Modifier or additive use); USES (Uses)
(brittle; method of fabrication of polymer **electrolyte**
for direct oxidation fuel cell)

IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(diamines, C1-20; method of fabrication of polymer
electrolyte for direct oxidation fuel cell)

IT **Acrylic polymers**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(diffusion barrier layer; method of fabrication of polymer
electrolyte for direct oxidation fuel cell)

IT Glycols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(ethers, solvent; method of fabrication of polymer
electrolyte for direct oxidation fuel cell)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; method of fabrication of
polymer **electrolyte** for direct oxidation fuel cell)

IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(glycol, solvent; method of fabrication of polymer
electrolyte for direct oxidation fuel cell)

IT Silicates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**inorg.**; method of fabrication of polymer
electrolyte for direct oxidation fuel cell)

IT Cation exchangers
Ceramics
Porosity
(method of fabrication of polymer **electrolyte** for
direct oxidation fuel cell)

IT Zeolites (synthetic), uses
RL: MOA (Modifier or additive use); USES (Uses)
(method of fabrication of polymer **electrolyte** for
direct oxidation fuel cell)

IT Fluoropolymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(method of fabrication of polymer **electrolyte** for
direct oxidation fuel cell)

IT Heterocyclic compounds
RL: MOA (Modifier or additive use); USES (Uses)
(nitrogen; method of fabrication of polymer **electrolyte**
for direct oxidation fuel cell)

IT Polyimides, uses
Polyketones
Polysulfones, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyether-, support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyimide-, support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyketone-, support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Fuel cells
(polymer **electrolyte**; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Polyquinoxalines
RL: TEM (Technical or engineered material use); USES (Uses)
(polyphenylquinoxalines, support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polysulfone-, support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Polybenzimidazoles
Polybenzoxazoles
Polyimides, uses
Polysulfones, uses
Polythiophenylenes
RL: TEM (Technical or engineered material use); USES (Uses)
(support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT Phosphosilicate **glasses**
RL: MOA (Modifier or additive use); USES (Uses)
(zirconium silicophosphate; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT 1314-23-4, Zirconia, uses 1314-56-3, Phosphorus oxide (P2O5), uses
RL: MOA (Modifier or additive use); USES (Uses)
(**glass**; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT 1318-00-9, Vermiculite 1318-74-7, Kaolinite, uses 1318-93-0, Montmorillonite, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 12047-27-7, Barium titanate, uses 12173-47-6, Fluorohectorite 12173-60-3, Illite 12269-78-2, Pyrophyllite 13772-29-7 14807-96-6, Talc, uses 126038-70-8, Aminohexane
RL: MOA (Modifier or additive use); USES (Uses)
(method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)
IT 108-10-1, Methyl isobutyl ketone
RL: TEM (Technical or engineered material use); USES (Uses)

(method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)

IT 67-63-0, 2-Propanol, uses 67-64-1, Acetone, uses 67-68-5, Dmso, uses 68-12-2, Dmf, uses 71-23-8, 1-Propanol, uses 78-59-1, Isophorone 78-93-3, Methyl ethyl ketone, uses 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 108-83-8, Diisobutyl ketone 108-94-1, Cyclohexanone, uses 109-99-9, Thf, uses 112-15-2, Carbitol acetate 123-42-2, Diacetone alcohol 123-86-4, n-Butyl acetate 127-19-5, Dimethylacetamide 141-97-9, Ethyl acetoacetate 512-56-1, Trimethylphosphate 616-38-6, Dimethyl carbonate 632-22-4, Tetramethylurea 872-50-4, N-Methyl-2-pyrrolidone, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(solvent; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)

IT 9002-84-0, PTFE 9002-88-4, Polyethylene 9003-07-0, Polypropylene 24937-79-9, PVDF 25684-76-8, Tetrafluoroethylene-vinylidene fluoride copolymer 31694-16-3, PEEK

RL: TEM (Technical or engineered material use); USES (Uses)
(support; method of fabrication of polymer **electrolyte** for direct oxidation fuel cell)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L60 ANSWER 3 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:33823 HCAPLUS
DOCUMENT NUMBER: 144:111307
TITLE: Direct methanol fuel cells, their proton-conductive **electrolyte membranes** having **inorganic** skeletons, and manufacture thereof
INVENTOR(S): Suzuki, Takayuki; Chiba, Takato
PATENT ASSIGNEE(S): Konica Minolta Holdings, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006012527	A2	20060112	JP 2004-186208	20040624

PRIORITY APPLN. INFO.: JP 2004-186208 20040624

AB The **electrolyte membranes** with high proton conductivity and reducing MeOH crossover, comprise **porous inorg**. films filling, in their pores, proton-**conductive polymers** prepared from sulfonic acid group-containing ethylenically unsatd. compds. and compds. $(R1O)_nSiR2_m$ (R1 = C≤4 alkyl; R2 = copolymerizable organic group; m, n = 1-3; m + n = 4). The membranes are formed by firing of precursors obtained from **inorg.** and organic particle dispersions.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST direct methanol fuel cell **electrolyte** crossover suppressed; proton cond hybrid polymer **electrolyte** DMFC; styryltrimethoxysilane vinylsulfonic acid copolymer DMFC **electrolyte**
IT Fuel cells
(direct methanol; proton-conductive **electrolyte membranes** filling sulfonic acid-containing polymers in **porous ceramics** for DMFC)
IT Ionic conductors
(proton conductive; proton-conductive **electrolyte membranes** filling sulfonic acid-containing polymers in **porous ceramics** for DMFC)
IT 7631-86-9, Snowtex 50, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(colloidal, **electrolyte membrane** skeletons; proton-conductive **electrolyte membranes** filling sulfonic acid-containing polymers in **porous ceramics** for DMFC)
IT 872580-31-9P 872580-32-0P 872580-33-1P 872580-34-2P 872580-35-3P 872580-36-4P 872580-37-5P 872580-38-6P 872580-39-7P 872580-40-0P
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(**electrolyte membranes**; proton-conductive **electrolyte membranes** filling sulfonic acid-containing polymers in **porous ceramics** for DMFC)
IT 9003-53-6, Polystyrene
RL: NUU (Other use, unclassified); USES (Uses)
(pore formers; proton-conductive **electrolyte membranes** filling sulfonic acid-containing polymers in **porous ceramics** for DMFC)

L60 ANSWER 4 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:235580 HCAPLUS
DOCUMENT NUMBER: 142:301004
TITLE: Proton-conductive solid **electrolyte membrane**, its manufacture and fuel cell which uses the membrane
INVENTOR(S): Kikugawa, Takashi; Kuraoka, Koji; Yazawa, Tetsuo
PATENT ASSIGNEE(S): National Institute of Advanced Industrial Science and Technology, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005071756	A2	20050317	JP 2003-298982	20030822

PRIORITY APPLN. INFO.: JP 2003-298982

200308
22

AB The **electrolyte membrane** is obtained by preparing an **inorg.**-organic hybrid film; removing organic mols. from the hybrid film to obtain an **inorg. porous** film; and introducing a H+-conductive group into the surface and pores of the **porous** film. The fuel cell uses the above **electrolyte.**

IC ICM H01M008-02
ICS H01B001-06; H01B013-00; C08G077-02; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell proton conductive solid **electrolyte membrane** manuf

IT Fuel cell **electrolytes**
Solid **electrolytes**
(manufacture of proton-conductive solid **electrolyte membranes** for fuel cells)

IT **Glass**, uses
RL: DEV (Device component use); USES (Uses)
(manufacture of proton-conductive solid **electrolyte membranes** for fuel cells)

IT Fuel cells
(solid **electrolyte**; manufacture of proton-conductive solid **electrolyte membranes** for fuel cells)

IT 4420-74-0, 3-Mercaptopropyl trimethoxy silane
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(manufacture of proton-conductive solid **electrolyte membranes** for fuel cells)

IT 78-10-4, Tetraethoxy silane
RL: DEV (Device component use); USES (Uses)
(manufacture of proton-conductive solid **electrolyte membranes** for fuel cells)

IT 106392-12-5, Ethylene glycol-propylene glycol block **copolymer**
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(manufacture of proton-**conductive** solid **electrolyte membranes** for fuel cells)

L60 ANSWER 5 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:657073 HCAPLUS
DOCUMENT NUMBER: 139:199955
TITLE: Method of fabrication of **electrolyte membrane** comprising a diffusion barrier and membrane electrode units for fuel cells
INVENTOR(S): Hennige, Volker; Hying, Christian; Hoerpel, Gerhard
PATENT ASSIGNEE(S): Creavis Gesellschaft Fuer Technologie Und Innovation m.b.H., Germany
SOURCE: PCT Int. Appl., 70 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

```
PATENT NO.            KIND   DATE       APPLICATION NO.          DATE
---------------       ----   --------   --------------------
--------
WO 2003069708          A2    20030821   WO 2003-EP169
                                                                 200301
                                                                 10
WO 2003069708          A3    20031231
    W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
        CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,
        GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
        LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
        NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ,
        TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
    RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
        BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
        EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
        SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,
        SN, TD, TG
DE 10205852            A1    20030821   DE 2002-10205852
                                                                 200202
                                                                 13
AU 2003205588          A1    20030904   AU 2003-205588
                                                                 200301
                                                                 10
PRIORITY APPLN. INFO.:                  DE 2002-10205852     A
                                                                 200202
                                                                 13

                                        WO 2003-EP169        W
                                                                 200301
                                                                 10
```

AB The invention relates to a proton conducting membrane, to a method for the production thereof and to the use of the same. The inventive membrane represents a novel class of proton conducting membranes, which can be used, in particular, in fuel cells. The disadvantage associated with conventional proton conducting membranes, which are based on a **porous**, flexible **ceramic membrane** is that the **electrolyte** is washed out of membranes of this type by water or methanol. The inventive membranes comprise a coating that is insol. in water and methanol as the diffusion barrier, the coating preventing the **electrolyte** from being washed out by the water or methanol. The **electrolyte membranes** can be configured in a flexible manner and can be used without problems as the membrane in a fuel cell.

IC ICM H01M008-02
ICS H01M002-16

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57

IT Metal alkoxides
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(Group VB, vanadium; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Group VB element compounds
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(alkoxides, vanadium; method of fabrication of

electrolyte membrane comprising diffusion
barrier and membrane electrode units for fuel cells)

IT Synthetic fibers
RL: TEM (Technical or engineered material use); USES (Uses)
(aluminum oxide; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Metal alkoxides
RL: CAT (Catalyst use); USES (Uses)
(aluminum; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Polybenzimidazoles
Polyimides, uses
Polysulfones, uses
Sulfonic acids, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Fuel cells
(direct methanol; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Phosphorus acids
RL: TEM (Technical or engineered material use); USES (Uses)
(esters; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Polyoxyalkylenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluorine- and sulfo-containing, ionomers, diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Acids, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(isopoly; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Coating materials
Fuel cell anodes
Fuel cell cathodes
Fuel cell electrodes
Fuel cell **electrolytes**
Soot
Vehicles
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Oxides (**inorganic**), uses
RL: CAT (Catalyst use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Ultrastable Y zeolites
RL: MOA (Modifier or additive use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Aluminosilicate **glasses**
RL: TEM (Technical or engineered material use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Heteropoly acids
RL: TEM (Technical or engineered material use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Phosphorus acids
RL: TEM (Technical or engineered material use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Polymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(organic acids; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Acids, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(organic; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Transition metal complexes
RL: CAT (Catalyst use); USES (Uses)
(phthalocyanine; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Polyketones
RL: TEM (Technical or engineered material use); USES (Uses)
(polyether-, diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyketone-, diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Composites
(**polymers**, with **inorg.** proton **conductors**; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Fluoropolymers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Ionomers
RL: TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, diffusion barrier; method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT Synthetic fibers
RL: TEM (Technical or engineered material use); USES (Uses)
(silica; method of fabrication of **electrolyte**

membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT Fuel cells
(solid **electrolyte**; method of fabrication of
electrolyte membrane comprising diffusion
barrier and membrane electrode units for fuel cells)
IT **Ceramics**
(substrate; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT **Glass**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(substrate; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT Metallophthalocyanines
RL: CAT (Catalyst use); USES (Uses)
(transition metal complexes; method of fabrication of
electrolyte membrane comprising diffusion
barrier and membrane electrode units for fuel cells)
IT Heteropoly acids
RL: TEM (Technical or engineered material use); USES (Uses)
(tungstophosphoric; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT 7440-44-0, Carbon, uses
RL: CAT (Catalyst use); USES (Uses)
(activated; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT 9010-39-3, Polytriazole 13598-36-2, Phosphonic acid 13765-94-1
13765-95-2, Zirconium phosphate 128611-68-7, Oxazole homopolymer
RL: TEM (Technical or engineered material use); USES (Uses)
(diffusion barrier; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT 1305-78-8, Calcium oxide, uses 1309-37-1, Ferric oxide, uses
1309-48-4, Magnesia, uses 1313-59-3, Sodium oxide, uses
12136-45-7, Potassium oxide, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**glass**; method of fabrication of **electrolyte**
membrane comprising diffusion barrier and membrane
electrode units for fuel cells)
IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8,
Ruthenium, uses 7782-42-5, Graphite, uses
RL: CAT (Catalyst use); USES (Uses)
(method of fabrication of **electrolyte membrane**
comprising diffusion barrier and membrane electrode units for
fuel cells)
IT 78-10-4, TEOS 78-38-6, Diethyl ethyl phosphonate 546-68-9,
Titanium tetraisopropylate 681-84-5, TMOS 762-04-9, Diethyl
phosphite 2171-98-4, 2-Propanol, zirconium(4+) salt 3087-36-3,
Titanium ethylate 3087-37-4, Titanium propylate 7429-90-5D,
Aluminum, alkoxides 7440-62-2D, Vanadium, alkoxides 7585-20-8,
Zirconium acetate 13746-89-9, Zirconium nitrate 13826-66-9,
Zirconium oxynitrate 17501-44-9, Zirconium acetylacetonate
23355-24-0, Titanium butylate 37203-76-2, Phosphoric acid ethyl
ester 40849-91-0, Titanium propylate 52892-19-0, 1-Propanol,
zirconium salt 71851-97-3, Zirconium phosphonate
RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); PROC (Process)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT 1343-98-2, Silicic acid
RL: MOA (Modifier or additive use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

IT 67-56-1, Methanol, uses 409-21-2, Silicon carbide sic, uses
1314-23-4, Zirconium oxide, uses 1314-56-3, Phosphorus oxide, uses
1344-28-1, Aluminum oxide, uses 7601-90-3, Perchloric acid, uses
7631-86-9, Silicon oxide, uses 7647-01-0, Hydrochloric acid, uses
7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
7697-37-2, Nitric acid, uses 7782-99-2, Sulfurous acid, uses
12033-89-5, Silicon nitride, uses 13463-67-7, Titanium oxide, uses
21006-68-8, Titanium phosphonate 70942-24-4 438461-55-3
578739-18-1
RL: TEM (Technical or engineered material use); USES (Uses)
(method of fabrication of **electrolyte membrane** comprising diffusion barrier and membrane electrode units for fuel cells)

L60 ANSWER 6 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2003:332034 HCAPLUS
DOCUMENT NUMBER: 138:341105
TITLE: Proton-conductive **electrolyte membrane** for fuel cell
PATENT ASSIGNEE(S): Sartorius AG, Germany
SOURCE: Ger. Gebrauchsmusterschrift, 22 pp.
CODEN: GGXXFR
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
DE 20217178	U1	20030430	DE 2002-20217178		20021107
DE 10155545	A1	20030522	DE 2001-10155545		20011112
DE 10155543	A1	20030528	DE 2001-10155543		20011112
DE 10155543	C2	20031113			
PRIORITY APPLN. INFO.:			DE 2001-10155543	IA	20011112
			DE 2001-10155545	IA	20011112

AB Proton-conductive **electrolyte membrane** comprises ≥1 base material and ≥1 dopant, whereby the dopant is a reaction product of an ≥1 dibasic **inorg.** acid

with an organic compound, whereby the reaction product has an acidic hydroxyl group or the condensation product of this compound with a multibasic acid. The base material contains ≥1 polymer and/or ≥1 **ceramic** material.

IC ICM B01D069-02
ICS H01M008-02; C08J005-22; C08G061-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST fuel cell proton conductive **electrolyte membrane**

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(aliphatic, C5-20; proton-conductive **electrolyte membrane** for fuel cell)

IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(aliphatic; proton-conductive **electrolyte membrane** for fuel cell)

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(aralkyl; proton-conductive **electrolyte membrane** for fuel cell)

IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(aromatic; proton-conductive **electrolyte membrane** for fuel cell)

IT **Ceramics**
Fuel cell electrodes
Fuel cell **electrolytes**
Membranes, nonbiological
(proton-conductive **electrolyte membrane** for fuel cell)

IT Polybenzimidazoles
Polymers, uses
RL: DEV (Device component use); USES (Uses)
(proton-**conductive electrolyte membrane** for fuel cell)

IT Fuel cells
(solid **electrolyte**; proton-conductive **electrolyte membrane** for fuel cell)

IT 1333-74-0, Hydrogen, uses
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**permeability**; proton-conductive **electrolyte membrane** for fuel cell)

IT 129-00-0D, Pyrene, tetraaza substituted **polymeric** derivs. 7440-06-4, Platinum, uses 25013-01-8, Polypyridine 190201-51-5, Pyrimidine **homopolymer**
RL: DEV (Device component use); USES (Uses)
(proton-**conductive electrolyte membrane** for fuel cell)

IT 104-76-7, 2-Ethylhexanol 108-95-2, Phenol, uses 298-07-7, Phosphoric acid, bis(2-ethylhexyl) ester 838-85-7, Phosphoric acid, diphenyl ester 2425-79-8 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
RL: MOA (Modifier or additive use); USES (Uses)
(proton-conductive **electrolyte membrane** for fuel cell)

IT 127-19-5, n,n-Dimethylacetamide
RL: TEM (Technical or engineered material use); USES (Uses)

(proton-conductive **electrolyte membrane** for
fuel cell)

L60 ANSWER 7 OF 7 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1989:241778 HCAPLUS
DOCUMENT NUMBER: 110:241778
TITLE: Electrochemical gas detection apparatus and method with novel three-component membrane
INVENTOR(S): Young, Ping; Polak, Anthony J.
PATENT ASSIGNEE(S): Allied-Signal, Inc., USA
SOURCE: U.S., 14 pp. Cont. of U.S. Ser. No. 753,494, abandoned.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 4795533	A	19890103	US 1987-71557		19870706
PRIORITY APPLN. INFO.:			US 1985-753494	A1	19850710

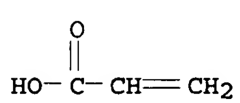
AB An electrochem. apparatus and method for detecting and measuring H and gaseous compds. capable of dissociating into or combining with H ions using a solid **electrolyte** concentration cell. A solid-**electrolyte membrane** comprising a 3-component blend prepared by admixing an organic polymer (poly(vinyl alc.)), an **inorg.** compound (a phosphoric acid), and a poly organic acid (**poly(acrylic** acid)), in a mutually miscible solvent. A reference substance in solid form is used. For increased strength, a membrane may be made composite with or attached to a **porous** support.

IT **9003-01-4, Poly(acrylic** acid)
25087-26-7
RL: ANST (Analytical study)
(in 3-component membrane for electrochem. gas sensor)

RN 9003-01-4 HCAPLUS
CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

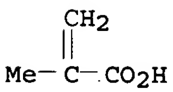
CRN 79-10-7
CMF C3 H4 O2



RN 25087-26-7 HCAPLUS
CN 2-Propenoic acid, 2-methyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 79-41-4
CMF C4 H6 O2



IC ICM G01N027-58
INCL 204-1T
CC 79-2 (Inorganic Analytical Chemistry)
IT **Electrolytic** cells
(gas sensors, 3-component membrane for)
IT **Glass** fibers, uses and miscellaneous
RL: USES (Uses)
(textiles, support for 3-component membrane in electrochem. gas sensor)
IT 2466-09-3, Diphosphoric acid 7664-38-2, Orthophosphoric acid, uses and miscellaneous 7803-60-3, Hypophosphoric acid 9002-89-5, Poly(vinyl alcohol) **9003-01-4**, **Poly(acrylic** acid) 9004-35-7, Cellulose acetate 10343-62-1, Metaphosphoric acid 24981-14-4, Poly(vinylfluoride) **25087-26-7** 25322-68-3, Poly(ethyleneglycol) 26336-38-9 50851-57-5
RL: ANST (Analytical study)
(in 3-component membrane for electrochem. gas sensor)

=>